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TRANSPORT MODEL WITH A BLENDED WING-BODY, VARIABLE-SWEEP
AUXILIARY WING PANELS, AND OUTBOARD TAIL SURFACES

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LOW-SPEED AERODYNAMIC CHARACTERISTICS OF A SUPERSONIC
TRANSPORT MODEL WITH A BLENDED WING-BODY, VARIABLE-SWEEP
AUXILIARY WING PANELS, AND OUTBOARD TAIL SURFACES*

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SUMMARY

An investigation was made in the Langley high-speed 7- by 10-foot tunnel to determine the low-speed aerodynamic characteristics of a proposed variable-sweep supersonic transport (SCAT 15) configuration. Tests were made at a Mach number of 0.186 and at angles of attack from -5° to 22° . The test Reynolds number was 1.35×10^6 per foot.

The results indicate that longitudinal instability occurs at moderate lift coefficients for all sweep positions of the auxiliary wing panels. However, by drooping the forewing, considerable improvements in the pitching-moment variation with lift coefficient can be obtained. There is a difference of 1.4 percent of the mean aerodynamic chord in the stability level between the 25° and 75° sweep-back wing positions for the configuration without the horizontal tails. Addition of the horizontal tails increased this stability difference to 12.6 percent. There is good agreement between experimental and theoretical span load distributions for the 25° and 75° sweepback positions of the auxiliary wing panels. Good agreement exists between the experimental and theoretical lift-curve slopes for the 25° sweepback position of the auxiliary wing panel. However, for the 75° sweepback position fair agreement over the angle-of-attack range was obtained only when second-order effects were considered. Conf. Author

INTRODUCTION

The National Aeronautics and Space Administration is studying the aerodynamic characteristics of configurations that may be suitable for use as supersonic transports. One of these configurations, which is the subject of the present investigation, is designated SCAT 15. A complete conceptual description of a preliminary model which led to the design of the present configuration is presented in reference 1, and the results of wind-tunnel tests are presented in references 1 to 3. The present configuration consists of a highly swept, twisted, and cambered wing (75° sweep of the leading edge) blended with a fuselage. Twin vertical tails are located at the wing tips in combination with

horizontal-tail surfaces located outboard of the vertical surfaces. For low-speed flight the configuration is equipped with an auxiliary wing whose sweep can be varied from 75° , where it is an integral part of the sweptback wing, to 25° in order to increase the lifting capability. Four nacelles, each individually pylon-mounted below the fixed sweptback wing, were employed to simulate the engine installation.

The purpose of this paper is to present with limited discussion the low-speed aerodynamic characteristics of the SCAT 15 configuration throughout the auxiliary wing sweep range and to obtain a measure of the high-lift capabilities associated with the addition of leading- and trailing-edge high-lift devices. These tests were made both with and without ground effect. Pressure measurements were made on the fixed and auxiliary wing panels to aid in the determination of the distribution of load on the wings. These tests were made in the Langley high-speed 7- by 10-foot tunnel at a Mach number of 0.186 and a Reynolds number per foot of 1.35×10^6 .

SYMBOLS

The forces and moments are referred to the body-axis system except the lift and drag which are referred to the wind-axis system. All coefficients are based on the geometric characteristics of the wing in the 75° sweep position. The moment reference point was at fuselage station 62.00 inches (fig. 1) for all configurations and sweep positions.

b	span of 75° swept wing, 32.00 in.
C_D	drag coefficient, $\frac{\text{Drag}}{qS}$
C_{D_0}	drag coefficient at zero lift
C_L	lift coefficient, $\frac{\text{Lift}}{qS}$
C_{L_α}	lift-curve slope, $\frac{\partial C_L}{\partial \alpha}$, per deg
C_l	rolling-moment coefficient, $\frac{\text{Rolling moment}}{qSb}$
$\frac{C_l c}{C_L c_{av}}$	nondimensional spanwise loading coefficient
C_{l_β}	effective-dihedral parameter, $\frac{\partial C_l}{\partial \beta}$, per deg
$C_{l_{\delta_{it}}}$	roll-control parameter, $\frac{\partial C_l}{\partial \delta_{it}}$, per deg

$C_{l\delta_r}$	rolling moment due to rudder effectiveness parameter, $\frac{\partial C_l}{\partial \delta_r}$, per deg
C_m	pitching-moment coefficient, $\frac{\text{Pitching moment}}{qS\bar{c}}$
$C_{m_{CL}}$	longitudinal stability parameter, $\frac{\partial C_m}{\partial C_L}$
C_n	yawing-moment coefficient, $\frac{\text{Yawing moment}}{qSb}$
C_{n_β}	directional-stability parameter, $\frac{\partial C_n}{\partial \beta}$, per deg
$C_{n_{\delta_{it}}}$	yawing moment due to roll-control parameter, $\frac{\partial C_n}{\partial \delta_{it}}$, per deg
$C_{n\delta_r}$	rudder effectiveness parameter, $\frac{\partial C_n}{\partial \delta_r}$, per deg
C_p	pressure coefficient
C_Y	side-force coefficient, $\frac{\text{Side force}}{qS}$
C_{Y_β}	side-force parameter, $\frac{\partial C_Y}{\partial \beta}$, per deg
c	local wing chord
\bar{c}	mean aerodynamic chord of 75° swept wing, 31.332 in.
c_d, c	drag coefficient based on cross-flow component of velocity ($\alpha = 90^\circ$)
c_f	local flap chord
h	vertical distance above ground board (positive upward), in.
i_t	horizontal-tail incidence angle (positive when leading edge is up), deg
L/D	lift-drag ratio
q	dynamic pressure, lb/sq ft
S	area of 75° swept wing, 6.096 sq ft
x	distance from wing leading edge along wing chord, in.
y	spanwise distance from center line of model, in.

z	vertical height above chord plane of horizontal tail (positive upward), in.
α	angle of attack, deg
β	angle of sideslip, deg
δ_c	deflection of canard (positive when leading edge is up), deg
δ_e	deflection of elevator (positive when trailing edge is down), deg
δ_f	deflection of trailing-edge flap (positive when trailing edge is down), deg
δ_n	deflection of forewing (positive when nose is up), deg
δ_{it}	differential deflections of horizontal tails, $i_{t,L} - i_{t,R}$
δ_r	deflection of rudder (positive when trailing edge is to the right), deg
δ_s	deflection of leading-edge slat (positive when leading edge is up), deg
ϵ	downwash angle, deg
Λ	sweep angle of auxiliary wing leading edge, deg

Model component designations:

W	wing
B	body
N	nacelles
H	horizontal tails
V	vertical tails
A	afterbody
C	canards

Subscripts:

ds	double slotted flap
ss	single slotted flap
R	right

L left

max maximum

MODEL

Drawings showing details of the basic model, the model components, and some of the modifications tested are shown in figures 1 to 3. Drawings showing details of the high-lift systems of the model are shown in figures 4 and 5.

The auxiliary wing panel, whose pivot was located at approximately 74.7 percent of the body length and 37.5 percent of the semispan of the wing in the 75° sweepback position, was capable of having its sweep angle varied from 25° to 75° . At 75° sweep the auxiliary wing panel becomes an integral part of the sweptback fixed wing. At the wing tip juncture, that is, the location on the fixed wing where the auxiliary wing panel fits, is a sharp discontinuity. For one test during this investigation this discontinuity was faired in as shown in figure 2. The horizontal tail H_1 has a circular-arc airfoil section with a thickness ratio of 3 percent. The horizontal tail H_2 is a 0.10-inch flat plate with rounded leading edges and beveled trailing edges. The vertical tail V_1 has a 2-percent-thick cambered circular-arc airfoil section. The vertical tail V_2 is a 0.188-inch flat plate with beveled leading and trailing edges and was equipped with a rudder which deflected along a hinge line shown in figure 3. Both vertical tails had one side flat in order to permit deflection of the horizontal tails. The canard is a 0.10-inch flat plate with rounded leading edges and beveled trailing edges.

Details of the double slotted flap, single slotted flap, and the slat are shown in figure 5. Flap deflections up to 60° were investigated for the double slotted flap and up to 35° for the single slotted flap. The twist distribution along the wing span for the slat is shown in figure 6. Split flaps located on the fixed wing, as shown in figure 4, were also investigated. The deflection angle of these split flaps was fixed at 30° .

Photographs of the model are presented in figures 7 and 8.

A drawing showing the location of the rows of pressure orifices on the fixed and auxiliary wing panels and the station number used in presenting the pressure data is given in figure 9. The pressure orifices are located in streamwise rows on the upper and lower surfaces of the fixed wing. However, for the auxiliary wing panel the pressure orifices are located in rows perpendicular to the trailing edge of the wing. Pressure measurements were not made on the body, horizontal tails, or vertical tails.

TESTS AND CORRECTIONS

The investigation was made in the Langley high-speed 7- by 10-foot tunnel at a Mach number of 0.186 which corresponds to a dynamic pressure of 50 pounds per square foot and a Reynolds number per foot of 1.35×10^6 .

In order to insure turbulent flow in the model boundary layer for the test, 1/8-inch-wide transition strips of No. 100 carborundum were placed at the 5-percent chord of the wing and tail surfaces and at 5 percent of the fuselage and nacelle length. Figure 10, which shows the effects of grit size on the aerodynamic characteristics of the model, indicates that No. 100 carborundum produces an essentially all-turbulent boundary layer under the test conditions. The forces and moments were measured through an angle-of-attack range of -5° to 22° and at sideslip angles of $\pm 5^\circ$.

The angle of attack was corrected for deflection of the sting-support system under load. The drag data were corrected to correspond to a pressure at the base of the fuselage and engine nacelles equal to free-stream static pressure. A drag coefficient of 0.0016 was subtracted from the data of the configuration with nacelles on. This drag coefficient corresponds to the theoretical internal skin-friction drag of the four nacelles. Jet-boundary corrections calculated by the method of reference 4 have been applied to the angle of attack and drag of all configurations tested except where the model was in proximity to the ground board. For the ground-board tests the jet-boundary corrections were found to be negligible and therefore were not applied. (See ref. 5.) Blockage corrections, calculated by the method of reference 6, were applied to the data. The dynamic pressure was corrected to account for the change in flow in the tunnel due to the presence of the model and ground board.

PRESENTATION OF RESULTS

The pressure coefficients are presented in tables I and II. The basic aerodynamic characteristics of the configuration are presented in figures 10 to 36. The aerodynamic characteristics of the configuration with high-lift devices are presented in figures 37 to 50, and in ground effect in figures 51 to 56. Some of the aerodynamic characteristics are summarized in figures 57 to 64.

DISCUSSION

In order to expedite publication of these data, only a limited discussion is presented herein. The effect of leading-edge sweep angle of the auxiliary wing panels on the pitching-moment variation with lift coefficient for the complete configuration is shown in figure 11. These data indicate that instability occurs at moderate lift coefficients for all wing-sweep positions.

An indication as to the cause of the pitch-up is presented in figures 57 and 58. Figure 57 shows the variation of the average downwash angle on the

horizontal tail with angle of attack for the configuration with the auxiliary wing panels swept back 25° and 75° . Also shown is the pitching-moment variation with angle of attack for the configuration with and without the horizontal tails. These data indicate that for the configuration with the auxiliary wing panels swept back 75° , the horizontal tails start to move out of the region of increasing upwash angles at a relatively low angle of attack. However, when the auxiliary wing panels are swept forward to 25° the movement of the horizontal tails out of the region of increasing upwash angles is delayed to a considerably higher angle of attack. This variation of upwash angle with angle of attack results in a horizontal-tail contribution to the pitching-moment variation with angle of attack that delays the pitch-up to a higher angle of attack for the configuration with the auxiliary wings swept back 25° , but accentuates the pitch-up at low angles of attack for the configuration with the auxiliary wing panels swept back 75° . Figure 58 shows the effect of the forewing droop on the pitching-moment variation with lift coefficient for the complete configuration with the auxiliary wing panels swept back 25° and 75° . These data show that by drooping the forewing, considerable improvements in the pitching-moment variation with lift coefficient can be obtained.

The lateral aerodynamic characteristics for the configuration with the auxiliary wing panels swept back 25° and 75° are presented in figures 17 and 23, respectively. These data indicate that directional stability is maintained throughout the angle-of-attack range for the complete configuration with the auxiliary wing panels swept back 75° (fig. 23). However, for the complete configuration with the auxiliary wing panels swept back 25° , the directional stability starts to decrease at an angle of attack of about 10° and becomes zero at an angle of attack of about 18° . These data also indicate that the vertical-tail contribution to the directional stability remains large at all angles of attack for both sweep positions of the wing. The addition of larger vertical tails to the configuration with the auxiliary wing panels swept back 25° (fig. 29) provides directional stability throughout the angle-of-attack range of the test.

The effect of deflecting the trailing-edge double slotted flap on the longitudinal aerodynamic characteristics for the complete configuration is presented in figure 38. These data indicate that the increments in lift coefficient resulting from deflection of the trailing-edge flap appear to be small. One reason for this effect is that as the flap is deflected, the resulting increase in downwash behind the auxiliary wing panels lowers the effective angle of attack on the fixed wing, and thereby reduces the lift carried by the fixed wing. These data also indicate that deflection of the trailing-edge flap produces a positive pitching-moment increment at zero lift, and has only a slight effect on the lift coefficient at which pitch-up occurs. However, the addition of a leading-edge slat to the configuration with the trailing-edge double slotted flap deflected to 40° (fig. 39) results in a considerable increase in the lift coefficient at the higher angles of attack, and in the lift coefficient at which pitch-up occurs.

The effect of wing sweep on the longitudinal aerodynamic characteristics of the basic configuration with the horizontal tails on and off is summarized in figure 59. These data show that sweeping the auxiliary wing panels forward from the 75° sweep position increases the lift-curve slope and the maximum

lift-drag ratio. The data also indicate that for the configuration with the horizontal tails off, there is a 1.4 percent \bar{c} change in the stability level between the 25° and 75° sweep position of auxiliary panels. However, with the addition of the horizontal tail, the stability variation with wing leading-edge sweep angle is increased to 12.6 percent \bar{c} .

The variation of trimmed maximum lift-drag ratio with wing leading-edge sweep angle is also shown in figure 59. Figure 60 shows the variation of the untrimmed and trimmed maximum lift-drag ratio with the longitudinal stability parameter. These data, along with the data of figure 59, show that the losses in maximum lift-drag ratio due to trimming this configuration at its level of stability is relatively small.

Figure 61 shows the effect of differential deflections of the horizontal tail on the lateral control characteristics of the configuration with the auxiliary wing panels swept back 25° and 75° . These data indicate that differential deflections of the horizontal tails provide positive roll control up to an angle of attack of 20° , and favorable yawing moment up to an angle of attack of 14° . Figure 62 shows the effect of rudder deflection on the lateral control characteristics. These data indicate that positive rudder effectiveness with no appreciable rolling moment was obtained throughout the angle-of-attack range.

A comparison of the experimental and theoretical span load distribution for the configuration with the auxiliary wing panels swept back 25° and 75° is presented in figure 63. The experimental span load distribution was obtained from integration of the pressure distribution presented in tables I(a), I(e), II(a), and II(f). The theoretical span load distribution was computed by the method presented in reference 7. These data indicate good agreement between the experimental and theoretical span load distribution for both sweep positions of the auxiliary wing panels. A comparison between the experimental and theoretical lift-coefficient variations with angle of attack is presented in figure 64. The theoretical lift-curve slope was computed by using the method of reference 7. These data indicate that the agreement between experiment and theory is good for the 25° sweep position of the auxiliary wing panel. However, for the 75° sweep position, as would be expected, the agreement between experiment and theory is good only in the low angle-of-attack range since this theory does not account for any second-order effects. Reference 8 suggests that these second-order effects can be accounted for by methods based on a cross-flow-separation concept which makes use of the cross-flow drag coefficient and the angle of attack ($c_d, c \sin^2\alpha$). The cross-flow drag coefficient, that is, the drag coefficient at an angle of attack of 90° for a wing of similar planform and aspect ratio, was taken as 1.65 as suggested by reference 9. These data are presented in figure 64 and indicate that a somewhat better agreement is obtained when the second-order effects are accounted for.

CONCLUSIONS

Results of an investigation to determine the low-speed aerodynamic characteristics of a proposed supersonic transport model with a blended wing-body,

variable-sweep auxiliary wing panels, and outboard tail surfaces indicate the following:

1. Longitudinal instability occurs at moderate lift coefficients for all sweep positions of the auxiliary wing panels. However, by drooping the fore-wing, considerable improvements in the pitching-moment variation with lift coefficient can be obtained.
2. There is a difference of 1.4 percent of the mean aerodynamic chord in the stability level between the 25° and 75° sweepback wing positions for the configuration with the horizontal tails off. Addition of the horizontal tails increased the stability difference to 12.6 percent.
3. There is good agreement between experimental and theoretical span load distributions for the 25° and 75° sweepback positions of the auxiliary wing panels. Good agreement exists between the experimental and theoretical lift-curve slopes for the 25° sweepback position of the auxiliary wing panel. However, for the 75° sweepback position fair agreement over the angle-of-attack range was obtained only when second-order effects were considered.

Langley Research Center,
National Aeronautics and Space Administration,
Langley Station, Hampton, Va., May 12, 1964.

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TABLE I.- PRESSURE COEFFICIENTS OVER WINGS OF MODEL WITH AUXILIARY WINGS

(a) $\Delta = 25^\circ$; $\delta_{f_{ds}} = 0^\circ$

Station	$\frac{x}{c}$	C_p at α of -					
		-5.23°	0.16°	5.53°	10.94°	16.37°	21.73°
1	.03	.5285	.3328	-.6517	-1.8807	-.5780	-.4718
	.06	.3171	.0999	-.6906	-1.5710	-.5780	-.4745
	.10	.1363	-.0776	-.7127	-1.1837	-.5504	-.4691
	.15	.0028	-.2246	-.7599	-1.1506	-.5255	-.4691
	.20	-.1446	-.3162	-.7682	-1.0731	-.5061	-.4691
	.30	-.2503	-.3689	-.4850	-.8380	-.4535	-.4608
	.50	-.3143	-.3189	-.5214	-.5421	-.4480	-.4663
	.70	-.2558	-.2052	-.2440	-.2868	-.4453	-.4745
	.90	-.2475	-.0055	-.1108	-.3871	-.4453	-.4773
	.03	.5813	.2497	-.9263	-2.3261	-.4535	-.5486
2	.06	.3477	.0083	-.9041	-1.2584	-.4647	-.5513
	.10	.1335	-.2107	-.9540	-1.2446	-.4729	-.5568
	.15	.0000	-.3411	-.9568	-1.1312	-.4563	-.5568
	.20	-.1474	-.4326	-.9513	-.9901	-.4425	-.5568
	.30	-.2642	-.4798	-.8459	-.7274	-.4480	-.5541
	.50	-.3003	-.3827	-.6545	-.3678	-.4618	-.5788
	.70	-.2225	-.2690	-.2940	-.3069	-.4563	-.5623
	.90	-.1807	.0000	-.0831	-.2820	-.4535	-.5541
	.03	.6203	.1471	-.1398	-1.9360	-.5559	-.6884
	.06	.3950	-.0887	-.1051	-1.5626	-.5697	-.7022
3	.10	.1335	.3105	-.1051	-1.2280	-.5697	-.6995
	.15	-.0027	-.4021	-.0179	-1.0316	-.5670	-.6940
	.20	-.1196	-.4659	-.9735	-.8491	-.5504	-.6748
	.30	-.2670	-.5463	-.9318	-.6721	-.5835	-.6995
	.50	-.2225	-.3882	-.5241	-.4702	-.5780	-.6884
	.70	-.1474	-.1552	-.2745	-.3789	-.5725	-.6884
	.90	.0140	.0333	.0028	-.3236	-.5531	-.6748
	.03	.5312	-.0693	-.13423	-1.3746	-.1229	-.1576
	.06	.3310	-.2385	-.1093	-1.3911	-.1202	-.1576
	.10	.1252	-.3938	-.11148	-1.3967	-.1339	-.1603
4	.15	.0056	-.4770	-.0678	-1.3525	-.1090	-.1494
	.20	-.1223	-.5249	-.0150	-1.2750	-.1090	-.1603
	.30	-.2808	-.6101	-.9596	-.1082	-.1063	-.1713
	.50	-.2197	-.4381	-.5574	-.7163	-.1076	-.1164
	.70	-.0806	-.0887	-.1802	-.4618	-.8352	-.9271
	.90	.0696	.0500	.0028	-.2683	-.6388	-.8449
	.03	.5507	-.1664	-.15811	-2.5556	-.23177	-.26937
	.06	.3588	.3105	-.12563	-2.4643	-.23647	-.27870
	.10	.1363	-.4687	-.12009	-2.1601	-.24229	-.26196
	.15	.0223	-.5546	-.1177	-1.4769	-.20439	-.19504
5	.20	-.1418	-.5935	-.10372	-.0399	-.15295	-.16239
	.30	-.2197	-.5491	-.7571	-.7578	-.1643	-.13963
	.50	-.1196	-.3661	-.3799	-.5614	-.9154	-.12337
	.70	-.0418	-.0776	-.2634	-.5676	-.8297	-.11713
	.90	-.1224	.0417	-.2357	-.5143	-.7052	-.9820
	0	.4311	.4632	.7656	-.0193	-.0608	.0110
	.03	-.3226	-.16363	.1637	.7192	.7606	.7408
	.06	-.3209	-.7654	-.0943	.3623	.4868	.5295
	.10	-.3281	-.5741	-.0804	.2296	.3374	.3924
	.15	-.3281	-.3661	-.0027	.1992	.3015	.3484
6	.20	-.3393	-.1664	.0583	.2158	.2849	.3210
	.30	-.3559	.0140	.1082	.2407	.2849	.2991
	.50	-.3532	.1276	.1997	.2241	.2241	.2223
	.70	-.3504	.1138	.1388	.1439	.1024	.0879
	.90	-.3226	.0389	.0000	-.0193	-.1659	-.2140
	0	.1753	.7045	.0971	-2.0384	-1.6816	-.5331
	.03	-.8482	-.1454	.4438	.7606	.7828	.7653
	.06	-.8510	-.7349	.1249	.5228	.4500	.6557
	.10	-.7842	-.3964	.1693	.4454	.5311	.5789
	.20	-.8120	.0000	.2607	.4011	.4509	.5020
7	.30	-.8593	.1138	.3106	.4011	.4150	.4554
	.50	-.5033	.1720	.3079	.3003	.3347	.3621
	.70	-.0362	.1553	.2386	.2241	.1964	.1976
	.90	.0891	.0944	.1388	.0360	-.0580	-.0822
	0	.2476	.7267	.0999	-2.7796	-.9403	-.8257
	.03	-.4227	.6490	.5160	.8021	.7469	.8011
	.06	-.4088	-.4298	.3356	.6445	.6418	.7490
	.10	-.4144	.1220	.3079	.5311	.5449	.6667
	.15	-.4366	-.0027	.2913	.4675	.4897	.5953
	.20	-.4255	.0444	.3106	.4481	.4648	.5569
8	.30	-.4227	.1054	.3051	.3956	.4121	.4911
	.50	-.3504	.0749	.2219	.2600	.2517	.3156
	.70	-.2335	.0527	.1526	.1190	.0637	.1015
	.90	.0861	.0610	.1054	-.0082	-.1852	-.2057
	0	.8464	-.3882	.4660	.6611	.6694	.6831
	.03	.7870	-.1165	.4521	.6887	.7413	.8038
	.06	.7842	-.0055	.3996	.6058	.6667	.7599
	.10	.8899	-.0055	.2802	.4648	.5422	.6392
	.20	-.8705	-.0055	.2497	.3983	.4785	.5843
	.30	-.7620	-.0110	.1997	.5237	.3845	.4856
9	.50	-.2836	-.0082	.1276	.1853	.2102	.2936
	.70	-.1028	-.0082	.0805	.0775	.0581	.1015
	.90	-.0250	.0056	.0333	-.0746	-.1770	-.1975
	0	.2393	.7656	-.6378	-3.4573	-4.0740	-.4.1503
	.03	.9539	-.2551	.5409	.7192	.6998	.6364
	.06	.9233	.0000	.4549	.6389	.6998	.7325
	.10	.8927	-.0055	.3717	.5477	.6473	.7161
	.15	.8565	.0083	.3163	.4813	.5781	.6776
	.20	.7564	.0028	.2663	.4177	.5144	.6145
	.30	.8533	-.0139	.2053	.3264	.4177	.5240
10	.50	.1584	-.0139	.1276	.2075	.2739	.3813
	.70	-.1612	-.0139	.0805	.1300	.1660	.2497

TABLE I.- PRESSURE COEFFICIENTS OVER WINGS OF MODEL WITH AUXILIARY WINGS - Continued

(b) $\Delta = 35^\circ$

Station	x/c	C_p at α of —					
		-5.20°	0.13°	5.51°	10.94°	16.24°	21.65°
1	.03	.4524	.2564	-.6754	-1.5998	-.2755	-.3337
	.06	.2869	.0810	-.6570	-1.4066	-.2807	-.3391
	.10	.1379	-.0648	-.6333	-.8853	-.2755	-.3310
	.15	-.0358	-.1808	-.6544	-.8605	-.2675	-.3364
	.20	-.1047	-.2536	-.6386	-.7612	-.2728	-.3391
	.30	-.1820	-.2806	-.5545	-.5129	-.2622	-.3257
	.50	-.2510	-.2429	-.4073	-.2703	-.2622	-.3204
	.70	-.2123	-.1375	-.1576	-.2040	-.2702	-.3204
	.90	-.2151	-.0189	-.0420	-.2013	-.2675	-.3151
	.02	.5159	.2132	.8515	-1.2632	-.3814	-.4726
2	.06	.3449	.0351	.7858	-.9405	-.3867	-.4753
	.10	.1627	-.1565	-.7937	-.7254	-.4000	-.4806
	.15	.0110	-.2536	-.7884	-.6233	-.3973	-.4859
	.20	-.0799	-.3319	-.7621	-.5350	-.4000	-.4806
	.30	-.1710	-.3644	-.6754	-.4689	-.4105	-.4832
	.50	-.2261	-.2968	-.4704	-.4247	-.4503	-.5046
	.70	-.1710	-.1916	-.1892	-.3806	-.4662	-.5046
	.90	-.1544	.0243	-.0131	-.3393	-.4582	-.4993
	.03	.5572	.1350	-.1091	-.9019	-.7549	-.7183
	.06	.3807	-.0539	-.8489	-.9322	-.7682	-.7289
3	.10	.1766	-.2267	-.8305	-.9156	-.7709	-.7369
	.15	.0655	-.2995	-.7937	-.8853	-.7628	-.7316
	.20	-.0330	-.3562	-.7516	-.8247	-.7470	-.7156
	.30	-.1626	-.4156	-.7043	-.7502	-.7628	-.7450
	.50	-.1351	-.2752	-.3784	-.6067	-.7364	-.7476
	.70	-.0606	-.1187	-.1524	-.5213	-.7152	-.7316
	.90	.0884	.0676	.0605	-.4192	-.6728	-.6942
	.03	.4882	-.0323	-.9304	-.14811	-.13192	-.12710
	.06	.3365	-.1646	-.8830	-.14673	-.13245	-.13057
	.10	.1683	-.2860	-.8752	-.14590	-.13510	-.13377
4	.15	.0579	-.3535	-.8252	-.14315	-.13616	-.13431
	.20	-.0386	-.3885	-.7805	-.14121	-.14040	-.13831
	.30	-.1737	-.4614	-.7201	-.12550	-.14384	-.14232
	.50	-.1442	-.3238	-.3784	-.6840	-.1125	-.1588
	.70	-.0386	-.0432	-.0708	-.2455	-.5006	-.8197
	.90	.0966	.0702	.0395	-.0689	-.2755	-.7398
	.03	.4911	-.1052	-.1091	-.24769	-.30358	-.3190
	.06	.3476	-.2186	-.9987	-.24216	-.40160	-.40347
	.10	.1627	-.3508	-.9408	-.20631	-.31153	-.28731
	.15	.0221	-.4237	-.8568	-.10509	-.7497	-.6715
5	.20	-.0717	-.4641	-.7858	-.7833	-.8450	-.14259
	.30	-.1407	-.4344	-.5729	-.6591	-.8900	-.13004
	.50	-.0827	-.3049	-.3390	-.5020	-.6490	-.11268
	.70	-.0497	-.0512	-.3390	-.6730	-.7602	-.15135
	.90	.1379	.0594	-.1997	-.6067	-.6887	-.9372
	.03	.2676	.3914	.5598	-.4026	.1908	-.26443
	.06	.2951	-.2307	.3418	.6234	.5775	.6088
	.10	.3116	.5640	.0526	.3724	.3629	.5047
	.15	.2951	-.4318	.0448	.2593	.2623	.4032
	.20	.3033	-.2617	.0658	.2235	.2331	.3552
6	.20	.3144	-.1134	.1157	.2069	.2119	.3152
	.30	.3420	.0324	.1577	.2041	.2119	.2777
	.50	.3641	.1161	.1919	.1848	.1643	.2030
	.70	.3778	.1026	.1472	.0994	.0637	.0828
	.90	.3475	.0406	.0474	-.0772	-.1669	-.1762
	.03	.1655	.6235	-.1261	-.15638	-.3258	-.5233
	.06	-.10398	-.8717	.4705	.6234	.6252	.6035
	.10	-.0012	.5404	.2077	.4717	.4902	.5982
	.15	.9764	.2915	.2287	.4082	.4478	.5501
	.20	-.1722	.0351	.2734	.3558	.3895	.4593
7	.30	-.0260	.1242	.3075	.3421	.3736	.4193
	.50	.1572	.1809	.3023	.2925	.3073	.3338
	.70	.1490	.1728	.2524	.2014	.1828	.2083
	.90	.0663	.1161	.1709	.0331	-.0450	-.0480
	.03	.0109	.5696	-.1524	-.19528	-.7046	-.6835
	.06	.5516	.5100	.5067	.6399	.6991	.6275
	.09	.5406	.3292	.3496	.5351	.6200	.6463
	.10	.5295	.0566	.3023	.4497	.5405	.5929
	.15	.5350	-.0135	.2813	.3945	.4795	.5367
	.20	.4992	.0560	.2944	.3779	.4504	.5074
8	.30	.5017	.1053	.2839	.3394	.4001	.4540
	.50	.2758	.0918	.2261	.2290	.2598	.3044
	.70	-.0220	.0702	.1657	.1159	.0954	.1095
	.90	.0194	.0945	.1288	-.0027	-.1245	-.1655
	.03	.8964	-.2942	.4495	.6096	.6279	.5608
	.06	.8136	-.0755	.4285	.5986	.6835	.6809
	.10	.7860	.0270	.3733	.5807	.6358	.6676
	.15	.9074	-.0162	.2813	.4110	.5193	.5688
	.20	.8550	.0190	.2445	.3642	.4769	.5394
	.30	.6288	.0108	.2103	.2897	.4027	.4593
9	.50	.1102	.0163	.1341	.1711	.2517	.2991
	.70	-.1102	.0243	.0973	.0828	.1166	.1335
	.90	-.0386	.0351	.0342	-.0303	-.0768	-.1308
	.03	.0828	.5992	-.7227	-3.3292	-3.4120	-3.9999
	.06	.8219	-.2483	.4889	.5904	.5563	.4273
	.09	.8853	.0379	.4126	.5462	.6093	.5848
	.10	.9784	.0217	.3470	.4855	.5881	.6169
	.15	.9488	.0270	.3075	.4331	.5458	.6009
	.20	.7006	.0270	.2628	.3807	.5034	.5715
	.30	.1571	.0270	.2182	.3062	.4292	.5074
10	.50	-.1986	.0270	.1603	.2096	.3232	.3979

TABLE I.- PRESSURE COEFFICIENTS OVER WINGS OF MODEL WITH AUXILIARY WINGS - Continued

(c) $\Delta = 45^\circ$

Station	$\frac{x}{c}$	C_p at $\alpha = 0^\circ$					
		-5.14°	0.22°	5.44°	10.87°	16.27°	21.69°
1	.03	.3735	.1494	-.7802	-.3751	-.2684	-.3284
	.06	.2598	.0083	-.7120	-.3751	-.2630	-.3284
	.10	.1624	-.0913	-.6439	-.3641	-.2550	-.3179
	.15	.0569	-.1852	-.4611	-.3448	-.2603	-.3179
	.20	-.0053	-.2461	-.6029	-.3337	-.2658	-.3231
	.30	-.0865	-.2571	-.4992	-.3116	-.2603	-.3152
	.50	-.1542	-.2157	-.3355	-.2979	-.2765	-.3231
	.70	-.1407	-.1383	-.1664	-.2951	-.2926	-.3179
	.90	-.1705	-.0497	-.0655	-.2979	-.3033	-.3179
	.03	.4493	.1245	-.8893	-.4992	-.4053	-.5085
2	.06	.3411	-.0082	-.7630	-.5074	-.4106	-.5138
	.10	.2084	-.1466	-.7365	-.5074	-.4241	-.5245
	.15	.1138	-.2267	-.7066	-.5047	-.4375	-.5350
	.20	.0108	-.2904	-.6738	-.4965	-.4321	-.5324
	.30	-.0487	-.3153	-.5892	-.5020	-.4536	-.5483
	.50	-.1001	-.2683	-.3873	-.5378	-.4966	-.5748
	.70	-.0487	-.1825	-.1637	-.5819	-.5288	-.5801
	.90	-.0324	-.0000	-.0028	-.5626	-.5583	-.5880
	.03	.6601	.0692	-1.2277	-.9433	-.7436	-.6728
	.06	.3599	-.0719	-.6439	-.9543	-.7596	-.6887
3	.10	.2111	-.1991	-.7311	-.9433	-.7946	-.7205
	.15	.1245	-.2571	-.6874	-.9322	-.8161	-.7364
	.20	.0108	-.2959	-.6439	-.9156	-.8295	-.7364
	.30	-.0433	-.3429	-.5783	-.9570	-.8563	-.7682
	.50	-.0270	-.2267	-.2837	-1.0867	-.9341	-.8582
	.70	.0271	-.0691	-.0845	-.8247	-.8188	-.9166
	.90	.1056	.0471	-.0109	-.0883	-.5449	-.9403
	.03	.4222	-.0470	-.9088	-.15446	-.14549	-.14834
	.06	.3167	-.1438	-.7721	-.15556	-.14818	-.15364
	.10	.2030	-.2350	-.7584	-.15832	-.15758	-.15735
4	.15	.1191	-.2932	-.6984	-.16218	-.16133	-.16132
	.20	.0434	-.3263	-.6547	-.16604	-.19676	-.17696
	.30	-.0421	-.3761	-.5811	-.14701	-.20133	-.17245
	.50	-.0460	-.2765	-.2892	-.3006	-.4913	-.10688
	.70	-.0407	-.0497	-.0927	-.1158	-.2845	-.8105
	.90	.1381	.0526	-.0327	-.0938	-.2496	-.7072
	.03	.4114	-.0968	-.2185	-.21487	-.25234	-.3.3272
	.06	.3085	-.1852	-.8348	-.2.2920	-.3.1650	-.4.3074
	.10	.1786	-.2959	-.7802	-.2.2314	-.3.2563	-.3.2212
	.15	.0758	-.3595	-.7147	-.6371	-.9368	-.1.4410
5	.20	.0352	-.3955	-.6629	-.6536	-.8133	-.1.2397
	.30	-.0594	-.3734	-.4938	-.6122	-.8456	-.1.1523
	.50	-.0297	-.2655	-.4201	-.5847	-.7113	-.1.1125
	.70	-.0704	-.0829	-.3929	-.7833	-.7489	-.1.0860
	.90	.1462	-.0167	-.0382	-.4385	-.5288	-.8794
	.0	.0677	.2656	-.2292	-.1351	-.1368	-.5298
	.03	-.2976	-.9597	-.5547	-.4414	-.4617	-.3922
	.06	-.3030	-.4788	-.1174	-.2619	-.3437	-.4133
	.10	-.2896	-.3540	-.0710	-.1904	-.2712	-.3709
	.15	-.3030	-.2240	-.0683	-.1627	-.2390	-.3206
6	.20	-.3518	-.1189	-.0873	-.1352	-.2041	-.2782
	.30	-.4032	-.0139	-.1119	-.1324	-.1852	-.2412
	.50	.7469	.0581	-.1228	-.0939	-.1316	-.1775
	.70	.5388	-.0443	-.0873	-.0304	-.0349	-.0663
	.90	-.0676	-.0167	-.0219	-.1599	-.1530	-.1457
	.0	-.3598	.3901	-.6029	-.9570	-.4966	-.5562
	.03	.8741	.6942	-.3902	-.4524	-.4537	-.3629
	.06	.4388	-.4729	-.1938	-.3779	-.4269	-.4822
	.10	.4687	-.2185	-.2074	-.3476	-.4027	-.4874
	.20	-1.5750	-.0167	-.2183	-.2897	-.3410	-.4106
7	.30	-.2192	-.0996	-.2456	-.2731	-.3114	-.3736
	.50	-.0894	.1411	-.2402	-.2317	-.2604	-.3020
	.70	-.0271	.1494	-.2019	-.1656	-.1504	-.2040
	.90	-.0027	.0996	-.1310	-.0139	-.0616	-.0476
	.0	-.1542	.3983	-.4420	-1.3791	-.5906	-.6622
	.03	-.4032	.3955	-.4202	-.5048	-.4994	-.4001
	.06	.3951	-.2627	-.2838	-.4551	-.5020	-.5034
	.10	.4167	-.1438	-.2374	-.3889	-.4510	-.4928
	.15	.4492	-.0276	-.2074	-.3365	-.4027	-.4530
	.20	.4682	-.0139	-.2238	-.3173	-.3705	-.4345
8	.30	-.4007	.0665	-.2074	-.2897	-.3382	-.3922
	.50	-.1785	.0609	-.1638	-.2069	-.2255	-.2703
	.70	.0054	.0498	-.1061	-.1214	-.0645	-.0954
	.90	.0450	.0665	-.0656	-.0415	-.1315	-.2357
	.0	-.7847	-.2544	-.3520	-.4469	-.4189	-.3285
	.03	-.7089	-.0636	-.3385	-.4627	-.5397	-.5299
	.06	-.7036	.0083	-.3002	-.4414	-.5289	-.5537
	.15	.8388	-.0497	-.1965	-.3310	-.4296	-.4742
	.20	-.7820	-.0415	-.1692	-.2952	-.3839	-.4478
	.30	-.4655	-.0415	-.1310	-.2401	-.3382	-.3948
9	.50	-.1894	-.0470	-.0737	-.1490	-.2362	-.2941
	.70	-.1461	-.0442	-.0383	-.0828	-.1316	-.1775
	.90	-.0270	-.0276	-.0109	-.0249	-.0457	-.0583
	.0	-.0757	.4066	-.8676	-2.8382	-3.0603	-2.2278
	.03	.7874	-.2378	-.3657	-.4110	-.3624	-.2676
	.06	-.8443	-.0110	-.3083	-.4166	-.4591	-.4651
	.10	-1.0256	-.0027	-.2538	-.3834	-.4672	-.4902
	.15	-1.1555	-.0276	-.2292	-.3504	-.4510	-.5034
	.20	-.3111	-.0359	-.1992	-.3145	-.4242	-.4848
	.30	-.1244	-.0055	-.1583	-.2510	-.3705	-.4504

TABLE I.- PRESSURE COEFFICIENTS OVER WINGS OF MODEL WITH AUXILIARY WINGS - Continued

(d) $\Delta = 55^\circ$

Station	$\frac{x}{c}$	C_p at α of -					
		-5.16°	0.15°	5.35°	10.75°	16.23°	21.58°
1	.03	.2849	-.0837	-.8740	-.2284	-.3161	-.3781
	.06	.2090	-.0053	-.8436	-.2284	-.3054	-.3791
	.10	.1574	-.0448	-.5033	-.2178	-.3001	-.3728
	.15	.0841	-.1268	-.5337	-.2231	-.3080	-.3728
	.20	.0218	-.1457	-.4923	-.2204	-.3054	-.3808
	.30	-.0190	-.1565	-.3789	-.2363	-.3133	-.3781
	.50	-.0922	-.1214	-.2516	-.2041	-.3293	-.3861
	.70	-.1058	-.0675	-.1134	-.3214	-.3133	-.3728
	.90	-.1817	-.0379	-.0442	-.3585	-.2974	-.3488
	.03	.3311	.0837	-1.0316	-.4409	-.3877	-.4953
2	.06	.2768	.0000	-.5641	-.4541	-.3904	-.5059
	.10	.1927	-.0917	-.6057	-.4648	-.4010	-.5166
	.15	.1330	-.1403	-.5586	-.4701	-.4090	-.5326
	.20	.0841	-.1781	-.5172	-.4515	-.4090	-.5433
	.30	.0164	-.1861	-.4259	-.4833	-.4355	-.5699
	.50	-.0190	-.1538	-.2765	-.5391	-.4833	-.6391
	.70	.0191	-.0971	-.0968	-.8818	-.5338	-.7642
	.90	.0597	.0324	-.0470	-.6321	-.7915	-.1344
	.03	.3393	.0540	-1.2197	-.7835	-.5684	-.6684
	.06	.2768	-.0378	-.6112	-.8074	-.5843	-.6870
3	.10	.1981	-.1079	-.5890	-.8366	-.5976	-.7376
	.15	.1439	-.1511	-.5421	-.8578	-.6162	-.7403
	.20	.0950	-.1673	-.4951	-.8791	-.6241	-.7349
	.30	.0299	-.1970	-.4286	-1.0332	-.6401	-.7589
	.50	.0408	-.1160	-.1880	-1.0438	-.8366	-.9107
	.70	.0570	.0486	-.0691	-.1513	-.8605	-.10466
	.90	.1195	.0810	-.0083	-.0399	-.7304	-.12116
	.03	.3203	-.0189	-1.1727	-.1.0757	-.1.0916	-.1.2277
	.06	.2632	-.0701	-.6168	-.1.1102	-.1.1501	-.1.2543
	.10	.1927	-.1295	-.5835	-.1.1952	-.1.2032	-.1.2943
4	.15	.1357	-.1592	-.5392	-.1.3944	-.1.2430	-.1.3581
	.20	.0787	-.1834	-.4978	-.1.8725	-.1.6626	-.1.5419
	.30	.0353	-.2188	-.4204	-.8712	-.1.8229	-.1.7389
	.50	.0353	-.1618	-.2295	-.1939	-.7622	-.1.3102
	.70	.0923	.0486	-.1327	-.1673	-.6374	-.1.1291
	.90	.1303	.0810	-.1134	-.3133	-.7277	-.1.0759
	.03	.3012	-.0566	-.6333	-.4767	-.1.9601	-.2.4713
	.06	.2416	-.1079	-.6527	-.1.6521	-.2.3320	-.3.0892
	.10	.1439	-.1970	-.5974	-.1.8964	-.2.5604	-.2.6072
	.15	.0841	-.2347	-.5421	-.8533	-.1.527	-.1.5925
5	.20	.0272	-.2536	-.4978	-.5125	-.8605	-.1.3901
	.30	-.0298	-.2429	-.4314	-.4435	-.6773	-.1.2622
	.50	.0299	-.1349	-.4839	-.7251	-.9349	-.1.3315
	.70	.0462	-.0458	-.1963	-.4648	-.7649	-.9587
	.90	.1357	.0486	-.0055	-.1142	-.4276	-.8176
	0	.0272	.1971	-.1548	-.1035	-.3665	-.3915
	.03	-.1411	.4912	.2933	.3188	.2391	.1518
	.06	-.1302	.2833	.1522	.2338	.2710	.2610
	.10	-.1492	.1781	.1024	.1859	.2497	.2797
	.15	-.1492	.1160	.0886	.1567	.2205	.2557
6	.20	-.1627	-.0458	.0747	.1275	.1806	.2185
	.30	-.1871	.0513	.0830	.1116	.1514	.1811
	.50	-.2144	.0513	.0802	.0691	.1010	.1279
	.70	-.2848	.0513	.0471	.0372	.0479	.0480
	.90	-.3175	-.0107	-.0359	-.1939	-.1195	-.1278
	0	-.1844	.2700	-.8436	-.5684	-.4886	-.4900
	.03	.3283	.3885	.2960	.3002	.2072	.0959
	.06	.3229	.2956	.1964	.3162	.3294	.3116
	.10	.2659	.1241	.1909	.3241	.3507	.3729
	.20	-.3229	.0594	.1715	.2657	.3002	.3356
7	.30	.4070	.0999	.1826	.2550	.2710	.3043
	.50	.4423	.1296	.1743	.2205	.2205	.2583
	.70	.3961	.1431	.1439	.1648	.1462	.1838
	.90	-.1329	.0945	.0775	.0532	-.0664	-.0452
	0	.3581	.2673	-.8159	-.9641	-.5949	-.6098
	.03	.4639	-.2077	.3125	.3454	.2550	.1226
	.06	.4721	-.1322	.2241	.3666	.3559	.3382
	.10	.5017	-.0863	.1826	.3373	.3612	.3835
	.15	.5291	.0324	.1494	.2975	.3347	.3703
	.20	.5508	.0324	.1604	.2923	.3294	.3729
8	.30	.6404	.0621	.1494	.2736	.3002	.3542
	.50	.4016	.0621	.1106	.2179	.2258	.2904
	.70	-.0380	.0621	.0720	.1594	.1302	.1838
	.90	-.1113	.0945	.0277	.0850	-.0451	.0320
	0	.6295	-.1457	.2324	.2896	.2019	.0716
	.03	.5345	-.0080	.2572	.3746	.3719	.3436
	.10	.5318	.0217	.2241	.3693	.4117	.4288
	.15	.6973	-.0378	.1300	.2816	.3347	.3649
	.20	.7895	-.0189	.0941	.2550	.3215	.3729
	.30	.7245	-.0323	.0747	.2179	.2923	.3436
9	.50	-.0922	.0378	.0305	.1620	.2098	.2930
	0	-.2306	.2375	-1.0814	-.8618	-1.5299	-1.6458
	.03	.7136	-.0782	.2407	.2763	.2072	.1066
	.06	.7408	.0270	.2102	.3215	.3320	.2957
	.10	.9958	.0243	.1715	.3055	.3586	.3622
	.15	-.7706	.0190	.1494	.2896	.3586	.3888
	.20	-.2306	.0190	.1355	.2683	.3507	.4075

TABLE I.-- PRESSURE COEFFICIENTS OVER WINGS OF MODEL WITH AUXILIARY WINGS - Concluded

(e) $\Delta = 75^\circ$

Station	$\frac{x}{c}$	C_p at α of -					
		-5.06°	0.05°	5.22°	10.64°	16.06°	21.33°
1	.03	.0305	-.0925	-.2563	-.2437	-.1929	-.2916
	.06	.0472	-.1033	-.2563	-.2330	-.2060	-.2916
	.10	.0527	-.0816	-.2430	-.2172	-.2034	-.2943
	.15	.0361	-.1006	-.2643	-.2304	-.2245	-.3025
	.20	.0305	-.0952	-.2830	-.2383	-.2351	-.3080
	.30	.0250	-.0843	-.2990	-.2330	-.2219	-.2970
	.50	.0083	-.0653	-.5153	-.2172	-.2324	-.3135
	.70	.0111	-.0408	-.4298	-.2330	-.2695	-.3741
	.90	.0195	-.0163	-.1067	-.3788	-.3672	-.4758
	2	.0417	-.0843	-.3604	-.3284	-.3038	-.4263
3	.06	.0472	-.0843	-.3577	-.3231	-.3117	-.4456
	.10	.0389	-.0952	-.3658	-.3258	-.3302	-.4703
	.15	.0333	-.0979	-.3791	-.3444	-.3381	-.4731
	.20	.0195	-.0979	-.3844	-.3761	-.3302	-.4649
	.30	.0000	-.0870	-.5073	-.3444	-.3435	-.4813
	.50	.0000	-.0952	-.4673	-.3735	-.4518	-.5969
	.70	.0028	-.0680	-.0454	-.6648	-.6367	-.7564
	.90	.0028	-.0272	-.0293	-.5801	-.7160	-.8609
	.03	.0666	-.0353	-.3791	-.3549	-.4042	-.5666
	.06	.0694	-.0516	-.3871	-.3628	-.4306	-.5969
4	.10	.0610	-.0680	-.4085	-.3921	-.4412	-.6078
	.15	.0500	-.0653	-.4245	-.4265	-.4439	-.6078
	.20	.0333	-.0625	-.4806	-.4556	-.4544	-.6133
	.30	.0111	-.0761	-.5020	-.4529	-.5098	-.7096
	.50	.0111	-.0462	-.0293	-.7709	-.7451	-.9435
	.70	.0111	-.0108	-.0454	-.6039	-.8269	-1.0260
	.90	.0083	-.0081	-.0480	-.2278	-.6235	-.8856
	.03	.0694	-.0408	-.3898	-.4052	-.5284	-.7729
	.06	.0832	-.0381	-.3952	-.4132	-.5443	-.7729
	.10	.0666	-.0462	-.4272	-.4344	-.5654	-.8004
5	.15	.0555	-.0516	-.5073	-.4556	-.5865	-.8306
	.20	.0361	-.0598	-.4993	-.5059	-.6552	-.8967
	.30	.0028	-.0734	-.1255	-.7179	-.7979	-1.0589
	.50	.0083	-.0571	-.1121	-.7735	-.9036	-1.1525
	.70	.0195	-.0081	-.0667	-.2251	-.5389	-.8004
	.90	.0111	.0409	-.0240	-.0689	-.2933	-.5363
	.03	.0639	-.0544	-.4352	-.5457	-.7715	-1.0040
	.06	.0722	-.0435	-.4619	-.5457	-.7556	-1.0122
	.10	.0333	-.0898	-.5661	-.5748	-.7556	-1.0617
	.15	.0250	-.1115	-.3524	-.5615	-.7001	-1.0507
6	.20	.0250	-.1060	-.2055	-.6357	-.7213	-1.0837
	.30	.0028	-.0925	-.2269	-.7814	-.8164	-1.1827
	.50	.0056	-.0680	-.1175	-.2807	-.5918	-.9544
	.70	.0028	.0327	-.0988	-.0768	-.4834	-.7564
	.90	-.0943	-.1088	-.1281	-.2172	-.4570	-.7454
	0	-.2107	.0327	-.2456	-.1907	-.2245	-.2943
	.03	-.1857	.0327	.0481	-.0238	-.0713	-.1485
	.06	-.2052	.0327	.0801	.0477	.0476	.0028
	.10	-.2024	.0327	.0775	.1007	.1190	.1128
	7	0	-.2052	-.0190	-.3070	-.3072	-.3672
8	.03	-.1692	.0354	.0508	-.0820	-.1717	-.2557
	.06	-.1830	.0409	.0801	.0690	.0476	.0110
9	0	-.2163	.0708	-.3043	-.2993	-.4332	-.5419
	.03	-.1802	.0762	.1042	.0583	-.1241	-.2695
	.06	-.1692	.0789	.1416	.1510	.1031	.0523
10	.03	-.3078	-.0272	.0401	-.0185	-.1268	-.2448
	.06	-.2357	.0517	.1335	.1298	.0952	.0248
	0	-.2967	-.0625	-.4512	-.5404	-.7662	-.9710
	.03	-.3245	.0082	.0455	.0345	-.0211	-.0824

TABLE II.- PRESSURE COEFFICIENTS OVER WINGS OF MODEL WITH FIXED WINGS

(a) $\Delta = 25^\circ$; $\delta_{f_{ds}} = 0^\circ$

Station	$\frac{x}{c}$	C_p at α of -					
		-5.15°	0.07°	5.53°	10.93°	16.44°	21.87°
11	.03	.0053	-.1251	-.3917	-.8196	-1.2237	-1.9914
	.06	.0000	-.1251	-.2785	-.8593	-1.3404	-2.1785
	.10	.0504	-.1112	-.2537	-1.1514	-2.1053	-3.3173
	.15	.0557	-.0918	-.2261	-.8621	-1.5797	-3.0642
	.20	-.0105	-.1223	-.2482	-.2608	-.6730	-1.8292
	.30	.0477	-.0918	-.1986	-.3233	-.5701	-1.1773
	.50	.0213	-.1279	-.2482	-.3629	-.5284	-1.7784
	.70	.0530	-.0556	-.1268	-.2070	-.2808	-1.4263
	.90	.0160	-.0278	-.0744	-.1049	-.0806	-1.374
	1.2	.03	.0821	-.1724	-.7336	-1.0266	-1.3404
12	.06	.0637	-.1529	-.7999	-.1060	-1.4184	-1.9446
	.10	.0583	-.1529	-.7833	-.1145	-1.3655	-1.8896
	.15	.0690	-.1279	-.4496	-.5286	-1.5184	-1.9475
	.20	.0690	-.1251	-.2261	-.6647	-1.9218	-2.4041
	.30	.0160	-.1974	-.3337	-1.0351	-1.8188	-2.5691
	.69	.0583	-.0278	-.0717	-.0425	-.1334	-1.374
	.90	.0106	-.0890	-.1075	-.1020	-.0945	-1.925
	.50	.0637	-.0278	-.0138	-.3374	-.6118	-1.8554
	.70	.0160	-.0834	-.0799	-.1446	-.2197	-1.5611
	.90	.0160	-.0667	-.0744	-.0992	-.1446	-1.3961
13	1.4	.20	.1007	-.0222	-.0744	-.2126	-.4032
	.30	.0690	-.0222	-.0938	-.2978	-.6202	-1.6821
	.50	.0160	-.0750	-.1489	-.4935	-.7509	-1.7454
	.70	.0265	-.1056	-.1489	-.4566	-.5784	-1.6766
	.90	.0292	-.0222	-.0854	-.2467	-.2836	-1.4593
	.20	.0769	.0056	-.1986	-.2751	-.3170	-1.3630
	.30	.0477	-.0222	-.1489	-.2126	-.2781	-1.3382
	.50	.1140	.0418	-.0165	-.1247	-.1835	-1.2888
	.70	.0425	-.0222	-.0634	-.0397	-.2141	-1.2888
	.90	.0213	-.0667	-.0358	-.0227	-.1920	-1.0109
15	1.6	0	.0213	-.0222	-.3806	-.7600	-1.3433
	.03	-.0741	-.0222	-.0220	-.1786	-.4088	-1.4138
	.10	-.0397	-.0222	.0442	.0653	.0835	.1375
	.15	-.0397	-.0222	.0415	.0908	.1502	.2229
	.20	.0186	.0028	.0828	.1277	.2058	.2889
	.30	-.0370	-.0278	.0579	.1220	.2170	.3081
	.50	.1192	-.0278	.0331	.1106	.2142	.3219
	.70	.0768	.0361	.0635	.1532	.2559	.3659
	.90	.1165	-.1501	-.0993	-.0453	-.0083	.0634
	1.7	0	.1562	-.0861	-.7999	-1.0379	-1.4712
16	.03	-.1669	-.0250	-.0330	-.1730	-.3865	-.5033
	.06	-.1139	-.0890	.0166	-.0283	-.0918	-.1183
	.10	-.1006	-.0333	.0166	.0113	.0111	.0303
	.15	.1218	-.0333	.0166	.0340	.0641	.0963
	.20	.1324	-.0333	.0166	.0539	.1002	.1596
	.30	.1245	-.0333	.0773	.1475	.2198	.3026
	.50	.0873	-.0333	.0497	.1050	.1697	.2531
	.70	.1059	-.1140	-.0248	-.0283	.0362	.1348
	.90	.0476	-.0389	-.0220	.0143	.0835	.1541
	1.8	.06	.7761	-.0139	.2731	.3857	.4646
19	.15	.1615	-.0278	.1132	.2099	.2976	.5034
	.20	.1324	-.0305	.0828	.1475	.2170	.3192
	.30	.1245	-.0305	.0028	.0426	.0891	.1679
	.50	.1059	.1223	-.0275	-.0198	.0084	.0825
	.70	.0715	-.0472	.0000	.0426	.1169	.1899
	.90	.0027	-.0500	-.0358	-.0198	.0195	.0221
	.15	.0873	-.0500	-.0138	-.0170	-.0528	-.0054
	.20	-.0052	-.0083	.0663	.0710	.0668	.1156
	.30	-.0079	-.0167	.0359	.0483	.0446	.1073
	.50	.0265	.0140	.0166	-.0056	.0056	.0798
20	.70	-.0052	-.0583	-.0275	-.0142	.0557	.1375
	.90	-.0026	-.0556	-.0248	-.0311	.0168	.0550
	.15	.1350	-.0556	.0110	-.0028	-.0167	.0000
	.20	.1271	-.0556	.0055	.0171	.0251	.0578
	.30	.1986	-.0611	-.0082	.0171	.0584	.0991
	.50	.1033	-.0361	.0110	.0369	.0919	.1431
	.70	.0557	-.0250	.0276	.0483	.1113	.1568
	.90	.0133	-.0556	-.0138	-.0311	.0557	.0909

TABLE II.- PRESSURE COEFFICIENTS OVER WINGS OF MODEL WITH FIXED WINGS - Continued

(b) $\Lambda = 25^\circ$; $\delta_{f_{ds}} = 40^\circ$

Station	$\frac{x}{c}$	C_p at α of -					
		-4.99°	0.59°	5.97°	11.54°	17.00°	22.08°
11	.05	.0054	-.1536	-.4201	-.8778	-1.3303	-2.1140
	.06	-.0053	-.1563	-.3055	-.9353	-1.4714	-2.3181
	.10	-.0053	-.1399	-.2755	-1.3277	-2.3343	-3.5425
	.15	.0349	-.1289	-.2510	-.9518	-1.7784	-3.3276
	.20	.0107	-.1536	-.2809	-.3264	-.8297	-1.9807
	.30	.0162	-.1399	-.2510	-.3840	-.6831	-1.2325
	.50	.0162	-.2111	-.3219	-.4444	-.6139	-1.7563
	.70	.0162	-.1508	-.1937	-.2688	-.3622	-.6638
	.90	.0162	-.0877	-.0872	-.1096	-.1050	-.2829
	1.2	.0699	-.2715	-.8566	-1.1822	-1.5432	-1.9698
12	.06	.0591	-.2140	-.9767	-1.2865	-1.6235	-1.9916
	.10	.0457	-.2194	-1.0803	-1.2892	-1.5681	-1.8446
	.15	.0511	-.2002	-.6275	-1.7939	-1.7756	-1.7740
	.20	.0484	-.2111	-.2701	-1.9531	-2.2375	-2.0896
	.30	.0107	.3072	-.4037	-1.2289	-2.0301	-1.9291
	.69	.0269	-.0905	-.1090	-.1179	-.2738	-.6421
	.90	.0081	-.1124	-.1036	-.0822	-.1244	-.3646
	.50	.0564	-.0603	-.0136	-.3950	-.6886	-.7890
	.70	.0081	-.0768	-.0655	-.1207	-.4286	-.5849
	.90	.0107	-.0575	-.0545	-.0274	-.2350	-.4625
13	.20	.1074	-.0219	-.1609	-.3593	-.3900	-.6312
	.30	.0914	-.0219	-.1063	-.4635	-.4674	-.6148
	.50	.0135	-.0219	-.0845	-.5431	-.5808	-.5577
	.70	.0081	-.0713	-.0818	-.3923	-.5753	-.5060
	.90	.0135	-.0301	-.0027	-.1646	-.3734	-.4135
	.20	.1047	.0440	-.0054	-.1837	-.2461	-.3373
	.30	.0806	.0110	-.0054	-.1618	-.2295	-.3265
	.50	.1450	.0796	-.0054	-.0164	-.1244	-.2965
	.70	.0591	-.0054	-.0054	-.0192	-.1023	-.2693
	.90	.0162	-.0905	-.0081	-.0275	-.0637	-.1033
14	0	.0162	-.0164	-.4256	-.7845	-1.2778	-1.2651
	.03	-.0751	-.0164	-.0081	-.1947	-.4342	-.4489
	.10	-.0429	-.0027	.0519	.0823	.0941	.1470
	.15	-.0429	-.0164	.0628	.1153	.1688	.2340
	.20	.0027	.0247	.0928	.1591	.2186	.2994
	.30	-.0483	.0028	.0928	.1647	.2435	.3238
	.50	-.1341	-.0137	.0928	.1865	.2905	.3619
	.70	-.0805	.0028	.1064	.2168	.3237	.3810
	.90	-.1261	-.1234	-.0682	-.0192	.0360	.0599
	0	-.1368	-.1700	-.9767	-1.1329	-1.6816	-1.6298
15	.03	-.1530	.0082	.0028	-.2167	-.4674	-.5141
	.06	-.1046	.0000	.0246	-.0192	-.1217	-.1278
	.10	-.0939	-.0164	.0383	.0302	.0083	.0300
	.15	-.1154	.0328	.0355	.0632	.0692	.1144
	.20	-.1368	-.0274	.0546	.0988	.1355	.1769
	.30	-.1556	.0165	.1364	.2250	.2960	.3483
	.50	-.0913	.0275	.1174	.1921	.2739	.3021
	.70	-.1288	-.0877	-.0108	.0357	.1024	.1252
	.90	-.0429	-.0246	-.0054	.0412	.0914	.1279
	.06	-.7678	.1153	.3574	.4692	.5422	.5605
16	.15	.2576	.0933	.2374	.3320	.4121	.4571
	.20	-.0805	.0879	.2019	.2826	.3762	.4054
	.30	-.0644	.0082	.0873	.1619	.2517	.2667
	.50	-.1315	.1371	-.0108	.0165	.0720	.0926
	.70	-.0563	-.0219	.0246	.0796	.1355	.1688
	.90	.0000	-.0164	-.0218	.0110	.0139	.0191
	.15	-.3113	.3155	-.1609	-.1399	-.0027	-.0027
	.20	-.2361	-.1975	-.0245	.0632	.1494	.1470
	.30	-.2684	-.2331	.0246	.1097	.1604	.1306
	.50	-.2953	-.2387	.0082	.0576	.0830	.0654
17	.70	-.1341	-.1399	-.0108	.0302	.0498	.1034
	.90	-.0106	.0328	-.0027	.0138	-.0166	.0354
	.15	-.2308	-.1810	-.0299	-.0328	.0581	.0109
	.20	-.2308	-.1782	-.0299	-.0328	.0857	.0626
	.30	-.2228	-.1837	-.0299	.0193	.0886	.0871
	.50	-.1906	-.1563	-.0299	.0714	.0802	.1171
	.70	-.2066	-.1152	.0328	.0961	.0609	.1389
	.90	-.0805	-.0466	.0410	.0385	-.0497	.0735
	0	-.1368	-.1700	-.9767	-1.1329	-1.6816	-1.6298
	.03	-.1530	.0082	.0028	-.2167	-.4674	-.5141
18	.06	-.1046	.0000	.0246	-.0192	-.1217	-.1278
	.10	-.0939	-.0164	.0383	.0302	.0083	.0300
	.15	-.1154	.0328	.0355	.0632	.0692	.1144
	.20	-.1368	-.0274	.0546	.0988	.1355	.1769
	.30	-.1556	.0165	.1364	.2250	.2960	.3483
	.50	-.0913	.0275	.1174	.1921	.2739	.3021
	.70	-.1288	-.0877	-.0108	.0357	.1024	.1252
	.90	-.0429	-.0246	-.0054	.0412	.0914	.1279
	.06	-.7678	.1153	.3574	.4692	.5422	.5605
	.15	.2576	.0933	.2374	.3320	.4121	.4571
19	.20	-.0805	.0879	.2019	.2826	.3762	.4054
	.30	-.0644	.0082	.0873	.1619	.2517	.2667
	.50	-.1315	.1371	-.0108	.0165	.0720	.0926
	.70	-.0563	-.0219	.0246	.0796	.1355	.1688
	.90	.0000	-.0164	-.0218	.0110	.0139	.0191
	.15	-.3113	.3155	-.1609	-.1399	-.0027	-.0027
	.20	-.2361	-.1975	-.0245	.0632	.1494	.1470
	.30	-.2684	-.2331	.0246	.1097	.1604	.1306
	.50	-.2953	-.2387	.0082	.0576	.0830	.0654
	.70	-.1341	-.1399	-.0108	.0302	.0498	.1034
20	.90	-.0106	.0328	-.0027	.0138	-.0166	.0354
	.15	-.2308	-.1810	-.0299	-.0328	.0581	.0109
	.20	-.2308	-.1782	-.0299	-.0328	.0857	.0626
	.30	-.2228	-.1837	-.0299	.0193	.0886	.0871
	.50	-.1906	-.1563	-.0299	.0714	.0802	.1171
	.70	-.2066	-.1152	.0328	.0961	.0609	.1389
	.90	-.0805	-.0466	.0410	.0385	-.0497	.0735

TABLE II.- PRESSURE COEFFICIENTS OVER WINGS OF MODEL WITH FIXED WINGS - Continued

(c) $\Delta = 35^\circ$

Station	$\frac{x}{c}$	C_p at α of -					
		-5.19°	0.17°	5.50°	10.91°	16.40°	21.82°
11	.03	.0079	-.0993	-.3637	-.7306	-1.2151	-2.1840
	.06	.0027	-.0966	-.2598	-.7712	-1.3496	-2.3546
	.10	.0397	-.0805	-.2352	-1.0446	-2.1040	-3.5594
	.15	.0581	-.0698	-.2106	-.7631	-1.5882	-3.3448
	.20	-.0078	-.0913	-.2270	-.2002	-.6693	-1.9859
	.30	.0502	-.0698	-.1805	-.2543	-.5486	-1.2240
	.50	.0291	-.0913	-.2161	-.2976	-.4992	-.8554
	.70	.0581	-.0375	-.1149	-.1759	-.3319	-.5638
	.90	.0265	.0027	-.0546	-.0730	-.0328	-.1733
	.03	.0793	-.1396	-.6893	-.9065	-1.3166	-1.9089
12	.06	.0581	-.1208	-.7441	-.9850	-1.3880	-1.9419
	.10	.0529	-.1208	-.7139	-.9850	-1.3304	-1.8319
	.15	.0661	-.0966	-.4048	-1.3693	-1.4731	-1.8649
	.20	.0688	-.0966	-.2106	-1.4829	-1.8763	-2.3325
	.30	.0186	-.1423	-.2954	-.8957	-1.7748	-2.5168
	.69	.0661	-.0080	-.0601	-.0594	-.2550	-.6381
	.90	.0212	-.0724	-.0930	-.0784	-.0960	-.3080
	.50	.0793	-.0080	-.0108	-.3924	-.7955	-1.0562
	.70	.0159	-.0590	-.0629	-.1569	-.3977	-.7646
	.90	.0212	-.0403	-.0629	-.0838	-.1728	-.5390
13	.20	.1110	.0430	-.0081	-.1596	-.3456	-.5281
	.30	.0740	.0027	-.0765	-.1759	-.4471	-.6353
	.50	.0238	-.0429	-.1176	-.2516	-.7022	-.7427
	.70	.0265	-.0751	-.1176	-.2950	-.7131	-.7591
	.90	.0265	-.0053	-.0738	-.1812	-.3758	-.5501
	.20	.0819	.0242	-.1942	-.2516	-.3099	-.3878
	.30	.0529	.0027	-.1093	-.2273	-.2908	-.3466
	.50	.1190	.0645	-.0164	-.0216	-.1782	-.2970
	.70	.0397	-.0053	-.0711	-.0135	-.1975	-.3438
	.90	.0186	-.0429	-.0137	.0271	.1619	-.2832
14	0	.0212	-.0321	-.3666	-.6738	-1.2015	-1.3120
	.03	-.0687	-.0053	-.0300	-.1298	-.3648	-.4290
	.10	-.0316	-.0080	.0493	.1002	.0961	.1348
	.15	-.0290	-.0080	.0520	.1191	.1537	.2091
	.20	.0212	.0269	.0493	.1543	.2030	.2751
	.30	-.0423	-.0080	.0602	.1462	.2112	.2944
	.50	-.1136	.0536	.0274	.1272	.2030	.3081
	.70	-.0818	-.0026	.0657	.1813	.2689	.3742
	.90	-.1241	-.1208	-.0903	-.0297	-.9902	.0716
	0	-.1584	-.0510	-.7550	-.9282	-1.3852	-1.6888
15	.03	-.1532	.0054	-.0273	-.1217	-.3565	-.5115
	.06	-.1004	-.0161	.0219	.0054	-.0877	-.1320
	.10	-.0951	-.0161	.0192	.0488	.0220	.0000
	.15	-.1136	-.0241	.0055	.0569	.0604	.0825
	.20	-.1320	-.0268	.0082	.0758	.1015	.1321
	.30	-.1082	-.0161	.0685	.1570	.2085	.2613
	.50	-.0898	-.0161	.0493	.1299	.1921	.2696
	.70	-.1389	-.0831	-.0246	.0108	.0632	.1486
	.90	-.0449	-.0161	-.0218	.0488	.0988	.1541
	.06	-.7133	.0215	.2626	.3411	.3594	.3631
16	.15	-.1691	-.0080	.1150	.2381	.3127	.3907
	.20	-.1427	-.0106	.0794	.1976	.2689	.3494
	.30	-.1373	-.0671	.0138	.1002	.1537	.2201
	.50	-.1056	-.0831	-.0383	.0136	.0302	.0909
	.70	-.0660	-.0134	.0109	.0785	.1290	.1981
	.90	.0000	-.0134	-.0327	.0054	.0329	.0468
	.15	-.0634	-.0161	-.0108	.0108	-.0384	-.0440
	.20	.0027	.0242	.0602	.1056	.0714	.0881
	.30	-.0026	.0242	.0466	.0866	.0604	.0991
	.50	.0291	.0377	.0274	.0271	.0082	.0825
17	.70	-.0052	-.0268	-.0164	.0136	.0604	.1486
	.90	-.0052	-.0268	-.0383	-.0026	.0302	.0771
	.15	.1268	-.0268	.0138	.0244	-.0192	.0028
	.20	-.1241	-.0268	.0165	.0407	.0302	.0523
	.30	-.1929	-.0268	-.0054	.0434	.0576	.1100
	.50	-.0660	-.0106	.0219	.0650	.0988	.1568
	.70	.0450	.0054	.0301	.0758	.1208	.1816
18	.90	.0079	-.0348	-.0108	.0217	.0522	.1404
	.15	-.1268	-.0268	-.0138	-.0244	-.0192	-.0028
	.20	-.1241	-.0268	.0165	.0407	.0302	.0523
	.30	-.1929	-.0268	-.0054	.0434	.0576	.1100
19	.50	-.0660	-.0106	.0219	.0650	.0988	.1568
	.70	.0450	.0054	.0301	.0758	.1208	.1816
	.90	.0079	-.0348	-.0108	.0217	.0522	.1404
	.15	-.1268	-.0268	-.0138	-.0244	-.0192	-.0028
20	.20	-.1241	-.0268	.0165	.0407	.0302	.0523
	.30	-.1929	-.0268	-.0054	.0434	.0576	.1100
	.50	-.0660	-.0106	.0219	.0650	.0988	.1568
	.70	.0450	.0054	.0301	.0758	.1208	.1816
	.90	.0079	-.0348	-.0108	.0217	.0522	.1404

TABLE II.-- PRESSURE COEFFICIENTS OVER WINGS OF MODEL WITH FIXED WINGS - Continued

(d) $\Delta = 45^\circ$

Station	$\frac{x}{c}$	C_p at α of -					
		-5.12°	0.20°	5.32°	10.93°	16.32°	21.73°
11	.03	.0105	-.0934	-.3190	-.7060	-1.1439	-1.3212
	.06	.0159	-.1014	-.2144	-.7409	-1.2481	-1.4915
	.10	.0501	-.0694	-.1855	-.9933	-1.9640	-2.2936
	.15	.0712	-.0587	-.1620	-.7355	-1.4456	-1.9870
	.20	.0000	-.0800	-.1725	-.1825	-.6034	-1.1114
	.30	.0606	-.0480	-.1228	-.2308	-.5101	-.7575
	.50	.0369	-.0694	-.1568	-.2576	-.4663	-.5216
	.70	.0606	-.0213	-.0862	-.1718	-.3182	-.2700
	.90	.0422	-.0079	-.0261	-.0616	-.0713	.0263
	.03	.0897	-.1334	-.5987	-.8590	-1.2234	-1.5702
12	.06	.0738	-.1121	-.6484	-.9288	-1.2948	-1.6279
	.10	.0606	-.0988	-.6065	-.9288	-1.2398	-1.5466
	.15	.0738	-.0774	-.3320	-.13046	-1.3852	-1.7275
	.20	.0738	-.0800	-.1594	-.13691	-1.7364	-2.1836
	.30	.0211	-.1255	-.2274	-.8214	-1.5992	-2.0368
	.69	.0843	.0080	-.0209	-.0724	-.2908	-.2254
	.90	.0238	-.0480	-.0444	-.0563	-.0932	.0236
	.50	.1107	.0428	-.0104	-.4295	-.8064	-.8571
	.70	.0211	.0027	-.0235	-.1933	-.4333	-.2254
	.90	.0159	.0000	-.0235	-.0831	-.1673	-.0524
13	.20	.1450	.0882	.0262	-.0966	-.3620	-.7051
	.30	.0949	.0374	-.0235	-.1181	-.4224	-.7681
	.50	.0211	.0027	-.0862	-.1073	-.6254	-.7445
	.70	.0264	.0613	-.0967	-.0913	-.6995	-.4456
	.90	.0264	.0107	-.0418	-.0671	-.3730	-.1546
	.20	.1002	.0428	-.1568	-.3355	-.2935	-.2018
	.30	.0580	.0054	-.0548	-.2603	-.2770	-.1651
	.50	.1213	.0668	.0158	-.0511	-.1590	-.1914
	.70	.0475	.0080	-.0261	-.0107	-.1590	-.1258
	.90	.0238	-.0240	.0132	-.0591	-.1921	-.3173
14	0	.0369	-.0026	-.3190	-.6496	-.2948	-.18061
	.03	-.0632	.0188	.0184	-.1020	-.3812	-.6737
	.10	-.0263	.0267	.0916	.1182	.1097	.1311
	.15	-.0342	.0080	.0890	.1397	.1674	.2359
	.20	.0185	.0428	.1151	.1799	.2277	.3067
	.30	-.0342	.0054	.0916	.1639	.2223	.3409
	.50	-.1027	.0054	.0575	.1397	.2195	.3539
	.70	-.0790	.0054	.1046	.2014	.3073	.4509
	.90	-.1133	-.1067	-.0470	.0162	.0385	.1625
	0	-.1449	-.0106	-.6432	-.8805	-1.3880	-1.8087
15	.03	-.1580	.0267	.0105	-.0913	-.3456	-.5452
	.06	-.0975	.0134	.0601	.0377	-.0658	-.1126
	.10	-.0842	-.0079	.0601	.0725	.0329	.0263
	.15	-.1106	-.0079	.0445	.0887	.0714	.1259
	.20	-.1212	-.0079	.0445	.0914	.1097	.1705
	.30	-.0948	-.0053	.0942	.1639	.2085	.2937
	.50	-.0764	-.0079	.0811	.1584	.2250	.3435
	.70	-.1159	-.0694	.0105	.0645	.1153	.2543
	.90	-.0368	-.0053	.0105	.0752	.1317	.2439
	0	-.6640	.0855	.2379	.2631	.2058	.1679
16	.06	-.1791	-.0026	.1413	.2524	.3265	.4221
	.20	-.1397	-.0053	.1151	.2202	.2909	.4063
	.30	-.1528	-.0641	.0523	.1557	.2030	.3277
	.50	-.1106	-.0747	.0105	.0699	.0823	.1967
	.70	-.0526	.0000	.0497	.1074	.1647	.2727
	.90	.0000	-.0106	.0079	.0322	.0769	.1285
	.15	-.0448	-.0160	.0340	.0779	.0110	.0315
	.20	.0159	.0561	.0994	.1450	.0961	.1311
	.30	.0027	.0374	.0916	.1235	.0850	.1573
	.50	.0422	.0561	.0707	.0617	.0329	.1573
17	.70	.0027	-.0106	.0262	.0457	.0879	.2177
	.90	.0027	-.0160	.0628	.0591	.0000	.0446
	.20	-.1238	.0027	.0681	.0645	.0494	.1180
	.30	-.2028	-.0133	.0497	.0617	.0879	.1757
	.50	-.0421	.0161	.0707	.0887	.1235	.2203
	.70	.0686	.0347	.0759	.1235	.1564	.2386
	.90	.0027	.0000	.0262	.0887	.0906	.1652
	.03	-.1449	-.0106	-.6432	-.8805	-1.3880	-1.8087
	.06	-.1580	.0267	.0105	-.0913	-.3456	-.5452
	.10	-.0975	.0134	.0601	.0377	-.0658	-.1126
18	.15	-.0842	-.0079	.0601	.0725	.0329	.0263
	.20	-.1106	-.0079	.0445	.0887	.0714	.1259
	.30	-.1212	-.0079	.0445	.0914	.1097	.1705
	.50	-.0948	-.0053	.0942	.1639	.2085	.2937
	.70	-.0764	-.0079	.0811	.1584	.2250	.3435
	.90	-.1159	-.0694	.0105	.0645	.1153	.2543
	0	-.0368	-.0053	.0105	.0752	.1317	.2439
	.06	-.6640	.0855	.2379	.2631	.2058	.1679
	.15	-.1791	-.0026	.1413	.2524	.3265	.4221
	.20	-.1397	-.0053	.1151	.2202	.2909	.4063
19	.30	-.1528	-.0641	.0523	.1557	.2030	.3277
	.50	-.1106	-.0747	.0105	.0699	.0823	.1967
	.70	-.0526	.0000	.0497	.1074	.1647	.2727
	.90	.0000	-.0106	.0079	.0322	.0769	.1285
	.15	-.0448	-.0160	.0340	.0779	.0110	.0315
	.20	.0159	.0561	.0994	.1450	.0961	.1311
	.30	.0027	.0374	.0916	.1235	.0850	.1573
	.50	.0422	.0561	.0707	.0617	.0329	.1573
	.70	.0027	-.0106	.0262	.0457	.0879	.2177
	.90	.0027	-.0160	.0628	.0591	.0000	.0446
20	.20	-.1238	.0027	.0681	.0645	.0494	.1180
	.30	-.2028	-.0133	.0497	.0617	.0879	.1757
	.50	-.0421	.0161	.0707	.0887	.1235	.2203
	.70	.0686	.0347	.0759	.1235	.1564	.2386
	.90	.0027	.0000	.0262	.0887	.0906	.1652

TABLE II.- PRESSURE COEFFICIENTS OVER WINGS OF MODEL WITH FIXED WINGS - Continued

(e) $\Delta = 55^\circ$

Station	$\frac{x}{c}$	C_p at α of -					
		-5.14°	0.17°	5.37°	10.72°	16.28°	21.66°
11	.03	-.0529	-.1143	-.3771	-.7254	-1.1423	-1.4176
	.06	-.0585	-.1006	-.2773	-.7530	-1.2501	-1.5777
	.10	-.0055	-.0925	-.2413	-1.0094	-1.9443	-2.3968
	.15	.0112	-.0761	-.2191	-.7530	-1.4438	-2.0797
	.20	-.0641	-.1006	-.2357	-.1986	-.5919	-1.1832
	.30	-.0083	-.0761	-.1774	-.2482	-.5033	-.8053
	.50	-.0223	-.0952	-.2052	-.2730	-.4702	-.5764
	.70	-.0027	-.0571	-.1497	-.2123	-.3429	-.3641
	.90	-.0223	-.0108	-.0887	-.0938	-.0276	-.0772
	12	.03	.0279	-.1469	-.6684	-.8743	-1.2169
12	.06	.0140	-.1170	-.6877	-.9377	-1.2805	-1.6963
	.10	-.0000	-.1224	-.5879	-.9433	-1.2197	-1.6107
	.15	.0112	-.0979	-.3467	-1.2991	-1.3691	-1.7956
	.20	.0112	-.0979	-.2218	-1.3818	-1.7120	-2.2507
	.30	-.0390	-.1360	-.2828	-.8081	-1.5737	-2.0907
	.69	.0279	-.0299	-.0831	-.1268	-.3402	-.3530
	.90	-.0390	-.0788	-.1053	-.0938	-.0331	-.0386
	.50	.1172	.0681	-.1387	-.4799	-.9569	-1.0978
	.70	-.0251	-.0653	-.0887	-.2785	-.3734	-.2371
	.90	-.0223	-.0299	-.0887	-.1351	-.0415	-.0910
13	.30	.1172	.0735	-.0416	-.1434	-.8518	-1.2770
	.50	-.0306	-.0217	-.1358	-.1213	-.9901	-.6619
	.70	-.0306	-.0898	-.1552	-.0965	-.5974	-.3254
	.90	-.0306	-.0163	-.0998	-.0330	-.0995	-.1792
	.20	.0530	.0164	-.1857	-.2813	-.3373	-.0109
	.30	.0028	-.0272	-.1026	-.0965	-.2738	-.1047
	.50	.0558	.0300	-.0416	-.0386	-.3512	-.1682
	.70	-.0334	-.0272	-.0859	-.0441	-.2101	-.1434
	.90	-.0334	-.0516	-.0416	.0194	.3237	.1766
	16	0	-.0362	-.0217	-.3716	-.6702	-1.2860
16	.03	-.1255	-.0244	-.0388	-.1213	-.3927	-.7612
	.10	-.0948	-.0244	.0222	.0800	.0857	.0635
	.15	-.0976	-.0244	.0250	.1048	.1522	.1821
	.20	-.0390	.0109	.0610	.1435	.1909	.2565
	.30	-.1031	-.0272	.0333	.1269	.1992	.2759
	.50	-.1701	-.0761	-.0110	.0911	.1881	.2841
	.70	-.1506	-.0190	.0389	.1766	.2877	.4082
	.90	-.1924	-.1415	-.1108	-.0330	.0249	.0884
	17	0	-.2147	-.0244	-.7099	.9101	-1.3911
	.03	-.2147	-.0272	-.0554	-.1186	-.3622	-.6261
17	.06	-.1617	-.0707	-.0082	-.0027	-.0885	-.1931
	.10	-.1645	-.0435	-.0082	.0359	.0056	-.0441
	.15	-.1784	-.0435	-.0249	.0359	.0416	.0497
	.20	-.1924	-.0435	-.0277	.0470	.0665	.0939
	.30	-.1589	-.0435	.0111	.0939	.1522	.2041
	.50	-.1533	-.0435	.0111	.1103	.1881	.2593
	.70	-.2091	-.1115	-.0388	.0221	.1163	.2069
	.90	-.1143	-.0326	-.0388	.0442	.1106	.1711
	18	.06	-.6024	.0164	.0888	.0884	.0083
	.15	-.2816	-.0299	.0610	.1656	.2296	.2814
18	.20	-.2203	-.0326	.0305	.1545	.2324	.3034
	.30	-.2370	-.1088	-.0166	.1021	.1798	.2620
	.50	-.2035	-.1143	-.0416	.0415	.1024	.1793
	.70	-.1282	-.0408	-.0055	.0773	.1494	.2014
	.90	-.0557	-.0408	-.0443	-.0027	.0498	.0083
	.15	-.1673	-.0408	-.0221	.0828	.1273	.1959
	.20	-.0529	.0109	.0500	.1435	.1688	.2345
	.30	-.0557	.0109	.0333	.1076	.0941	.1490
	.50	-.0334	.0245	.0111	.0331	.0360	.0607
	.70	-.0669	-.0435	-.0388	.0083	.0637	.0994
19	.90	-.0669	-.0408	-.0582	-.0138	.0360	.0083
	.15	-.1673	-.0408	-.0028	.0276	.0443	-.0275
	.20	-.1673	-.0408	.0056	.0387	.0720	.0276
	.30	-.1617	-.0435	-.0139	.0194	.0802	.0690
	.50	-.0418	-.0136	.0056	.0442	.0969	.0966
	.70	-.0223	-.0054	.0111	.0663	.1218	.1076
	.90	-.0474	-.0381	-.0388	.0331	.0886	.0194
	20						

TABLE II-- PRESSURE COEFFICIENTS OVER WINGS OF MODEL WITH FIXED WINGS - Concluded

(f) $\Delta = 75^\circ$

Station	$\frac{x}{c}$	C_p at α of -					
		-5.05	0.10°	5.26°	10.53°	15.99°	21.37°
1	.03	-.0221	-.1275	-.3411	-.6729	-1.1193	-1.5308
	.06	-.0331	-.1248	-.2448	-.6919	-1.2177	-1.6659
	.10	-.0055	-.1026	-.2173	-.8764	-1.8814	-2.4824
	.15	.0111	-.0887	-.1898	-.6891	-1.4005	-2.1706
	.20	-.0442	-.1220	-.2090	-.1546	-.5428	-1.2825
	.30	-.0055	-.0859	-.1512	-.1980	-.4499	-.8550
	.50	-.0276	-.0887	-.1567	-.1980	-.3993	-.6067
	.70	-.0276	-.0748	-.1320	-.1709	-.3571	-.4854
	.90	-.0276	-.0471	-.0633	-.0922	-.1771	-.2592
	0	.0332	-.1552	-.6133	-.7760	-1.1417	-1.4370
12	.03	.0139	-.1275	-.5831	-.8357	-1.1924	-1.4590
	.06	-.0055	-.1358	-.4620	-.8412	-1.1249	-1.3846
	.10	.0083	-.1026	-.2750	-1.1667	-1.2486	-1.5142
	.20	.0056	-.0998	-.1953	-1.2265	-1.5524	-1.8039
	.30	-.0387	-.1387	-.2310	-.6675	-1.3892	-1.8232
	.69	-.0331	-.0776	-.0990	-.0976	-.2672	-.3972
	.90	-.0138	-.0360	-.0604	-.1438	-.4724	-.6536
	0	.0027	-.0304	-.0165	-.3988	-.5456	-.6013
	.70	.0609	-.0304	-.3438	-.0840	-.1715	-.2510
	.90	-.0055	-.0831	-.0990	.0055	-.0843	-.4744
13	0	.0331	-.0388	-.3466	-.6404	-1.1361	-1.5998
	.03	-.1050	-.0277	-.0220	-.1140	-.3515	-.5930
	.10	-.0387	-.0277	.0303	.0923	.0732	.1021
	.15	-.0801	-.0277	.0248	.1059	.1322	.1876
	.20	-.0442	-.0277	.0605	.1412	.1772	.2428
	.30	-.0442	-.0277	.0275	.1195	.1688	.2565
	.50	-.1299	-.0970	-.0274	.0760	.1238	.2235
	.70	-.1162	-.0360	.0358	.1574	.2475	.3697
	.90	-.1659	-.1608	-.1045	-.0081	-.0084	.0745
	0	-.1383	-.0443	-.6409	-.8412	-1.2684	-1.6686
14	.03	-.1880	-.0443	-.0137	-.0922	-.3178	-.5102
	.06	-.1354	-.0831	.0083	.0191	-.0703	-.1407
	.10	-.1272	-.0443	-.0027	.0408	.0029	-.0054
	.15	-.1438	-.0471	-.0302	.0353	.0226	.0442
	.20	-.1548	-.0943	-.0357	.0353	.0451	.0828
	.30	-.1162	-.0416	-.0054	.0787	.1013	.1600
	.50	-.0995	-.0416	-.0137	.0543	.0844	.1545
	.70	-.1576	-.1275	-.0192	-.0190	.0648	.1545
	.90	-.1050	-.0332	-.0192	.0570	.1041	.1848
	0	-.2932	-.0332	-.0027	.0000	-.0562	-.1847
15	.06	-.2738	-.0915	-.0247	.0326	.0226	.0331
	.15	-.2157	-.0887	-.0357	.0435	.0395	.0690
	.20	-.1770	-.1248	-.0329	.0191	.0310	.0911
	.30	-.1770	-.1303	-.0329	.0137	.0563	.1324
	.50	-.1244	-.0443	.0110	.0977	.1463	.2290
	.70	-.0470	-.0471	-.0357	.0137	-.0422	-.0330
	.90	-.4591	-.0943	-.0109	.0462	.0254	.0524
	0	-.3540	-.0194	.0634	.1249	.1266	.1600
	.30	-.2489	-.0194	.0468	.1004	.1069	.1463
	.50	.0000	-.0082	.0083	.0381	.0507	.1214
16	.70	-.0552	-.0526	-.0109	.0489	.0732	.1766
	.90	-.0470	-.0526	-.0054	.0000	-.0281	-.0054
	0	-.2101	-.0554	.0303	.0543	.0338	.0524
	.30	-.2046	-.0360	.0468	.0841	.0648	.0994
	.50	-.2406	-.0499	.0275	.0787	.0844	.1379
	.70	-.2987	-.0277	.0441	.0787	.0816	.1463
	.90	-.1272	-.0082	.0688	.0787	.0760	.1352
	0	-.0304	-.0443	.0138	-.0325	-.0675	-.0165

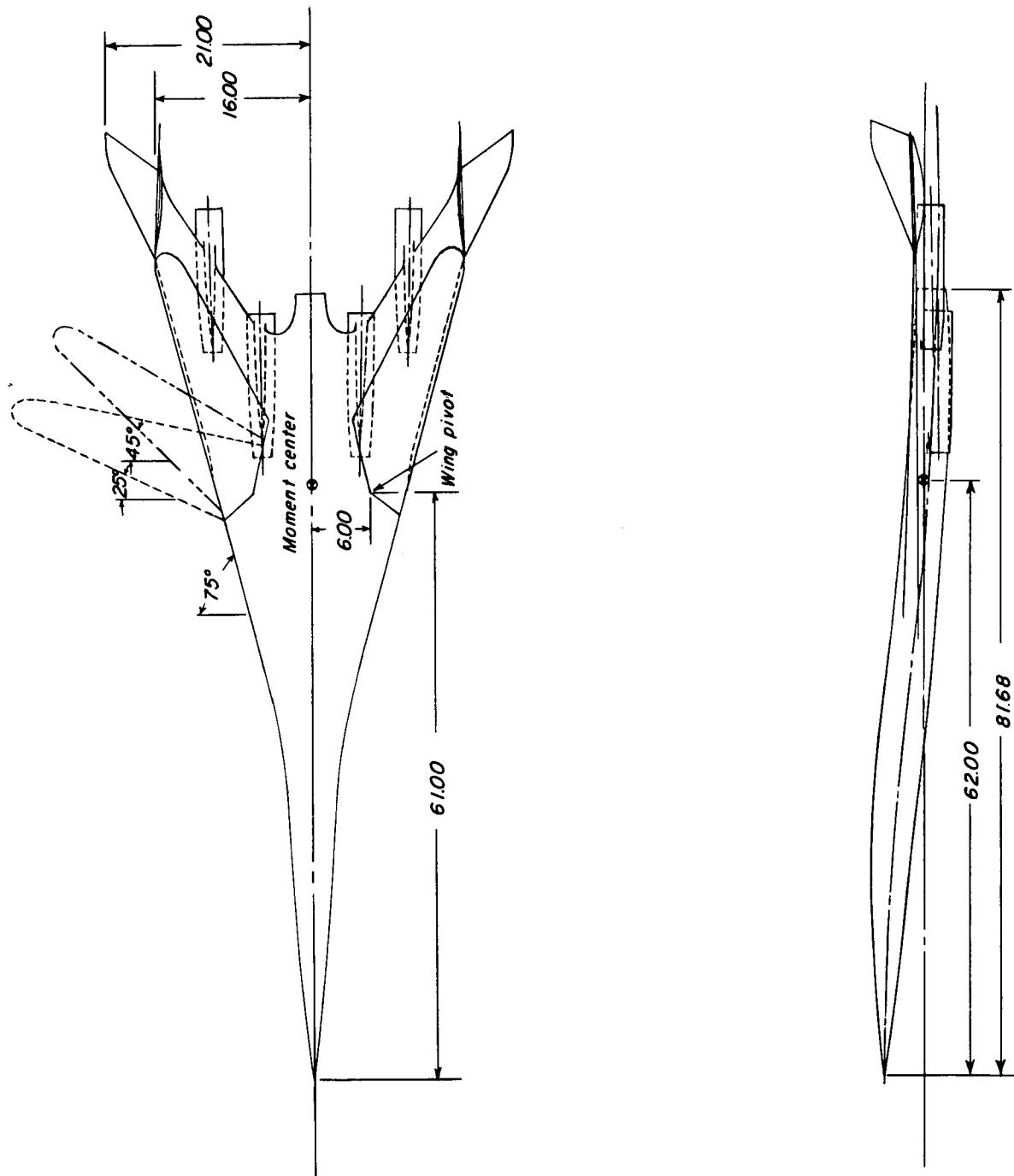


Figure 1.- Drawing of basic configuration. Linear dimensions are in inches.

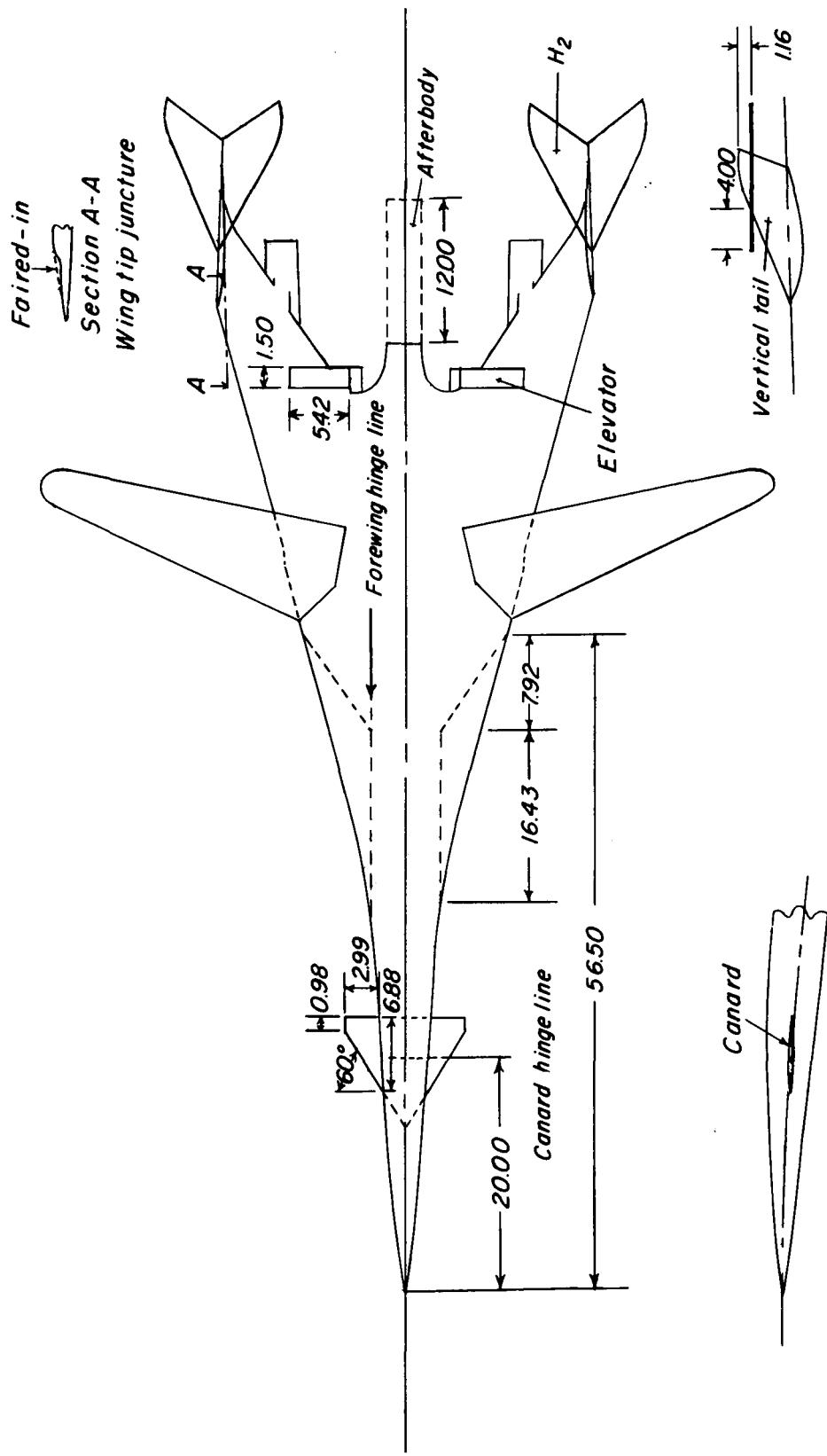
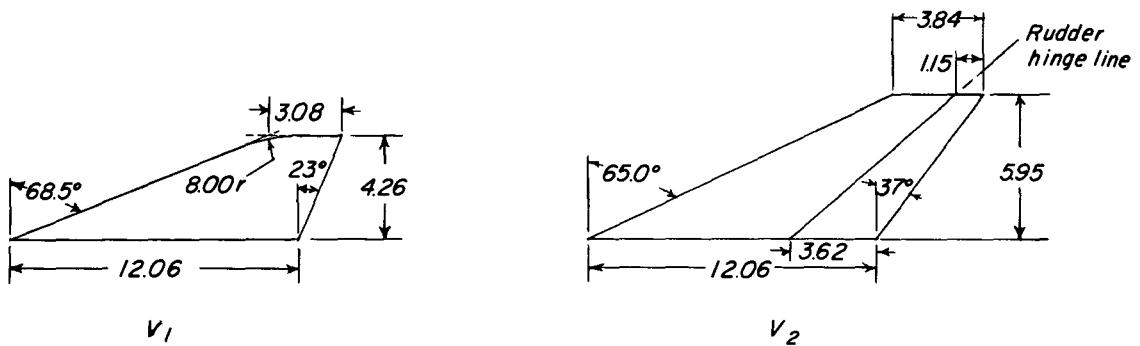
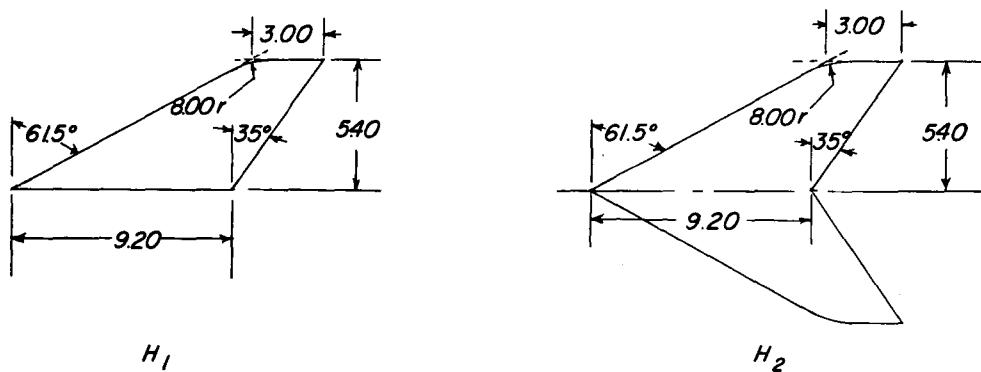


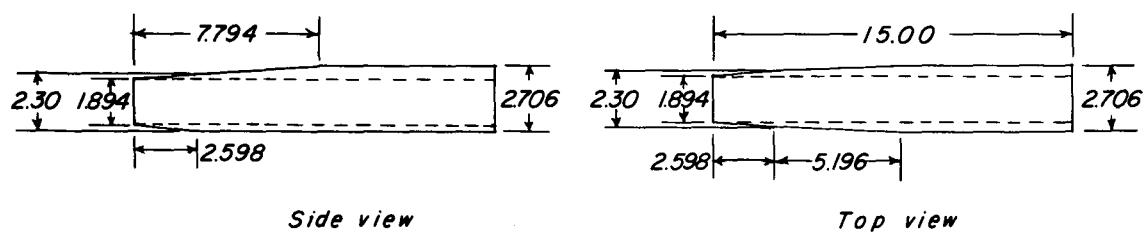
Figure 2. - Drawing of configuration with canard, afterbody, hinged forewing, and large horizontal tails. Linear dimensions are in inches.



(a) Vertical tails.



(b) Horizontal tails.



(c) Nacelle.

Figure 3.- Drawing showing the horizontal and vertical tails and nacelle. Linear dimensions are in inches.

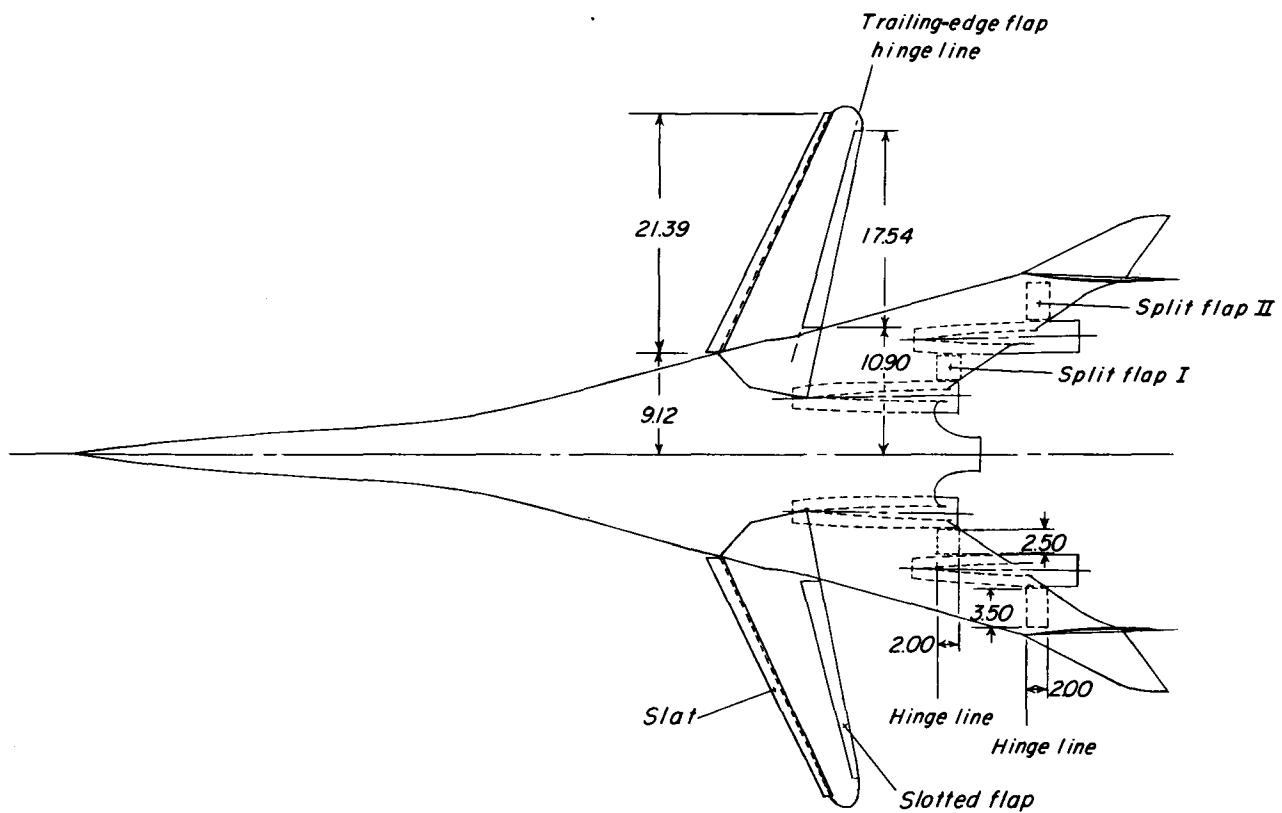
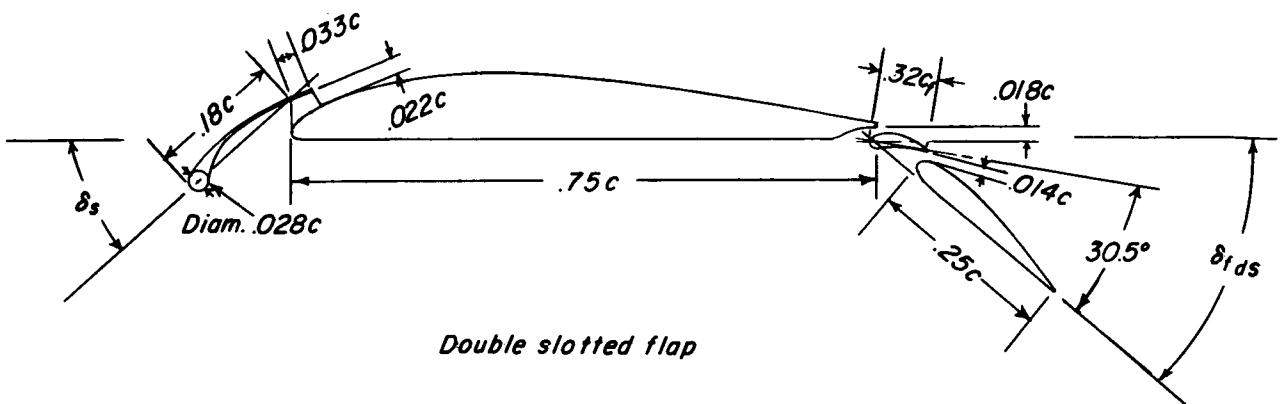
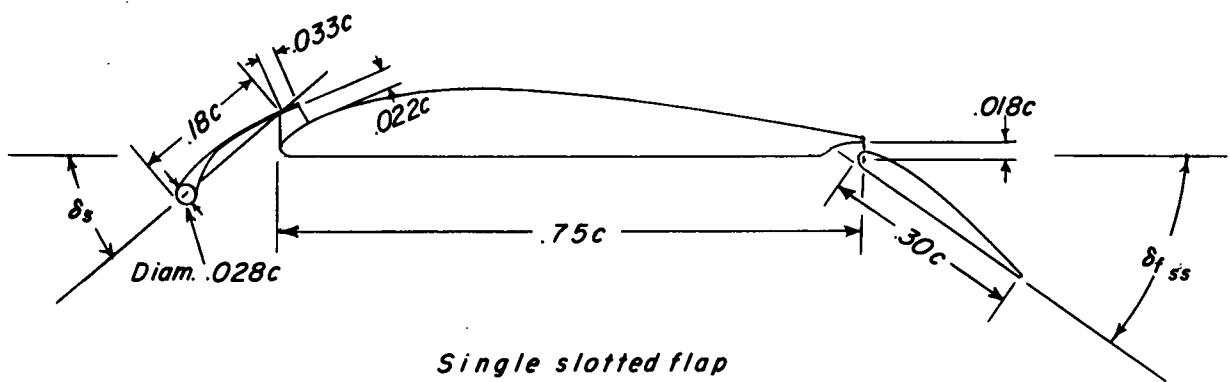


Figure 4.-- Drawing of the configuration showing locations and dimensions of the high-lift devices and the landing gears. Linear dimensions are in inches.



Double slotted flap



Single slotted flap

Figure 5.- Drawing showing the details of the double slotted flap, the single slotted flap, and the leading-edge slats.

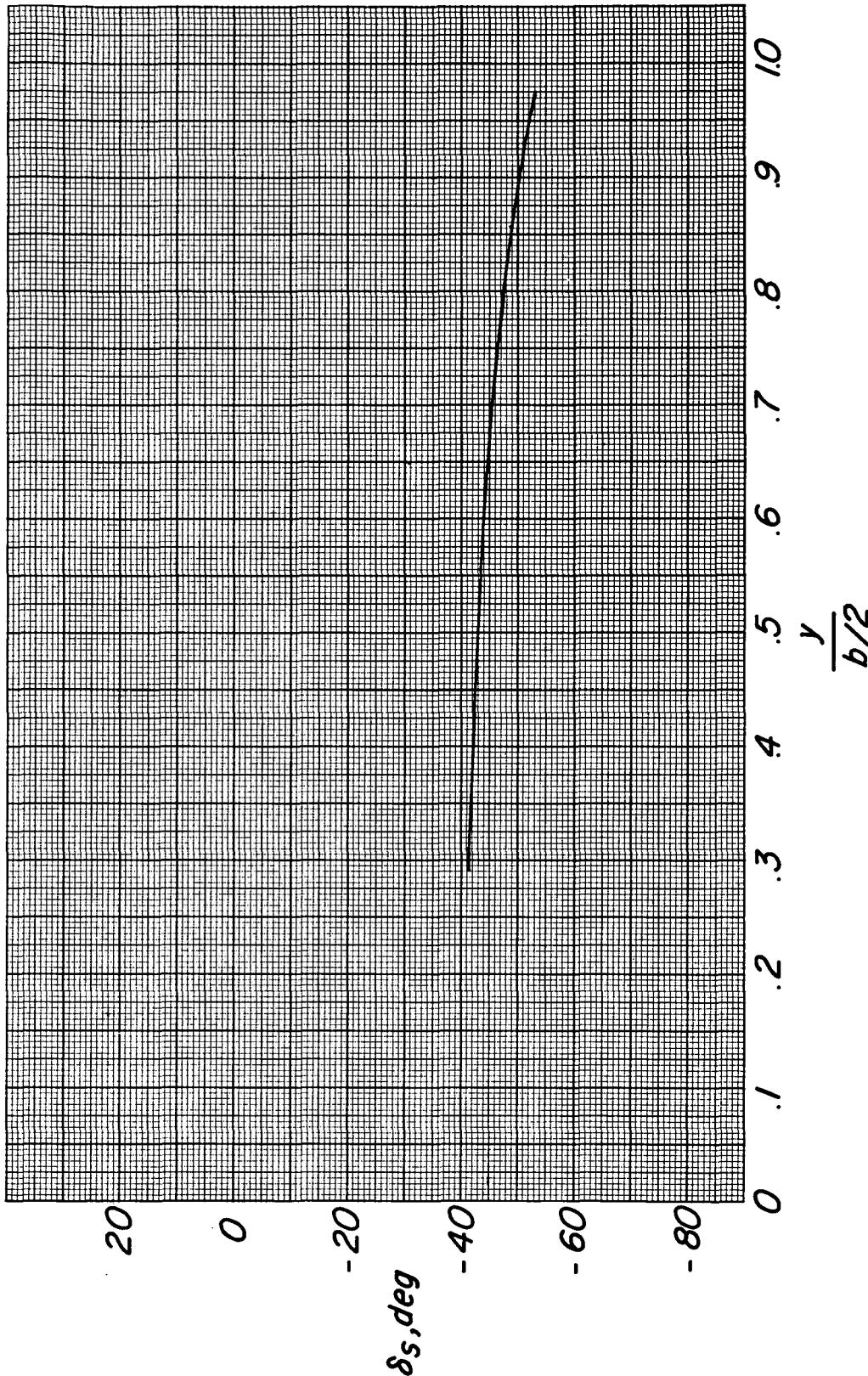
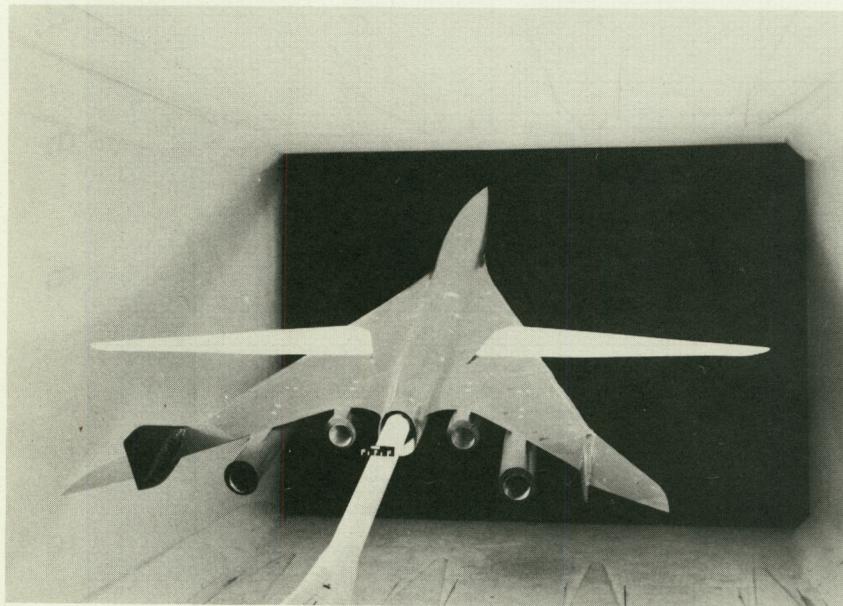


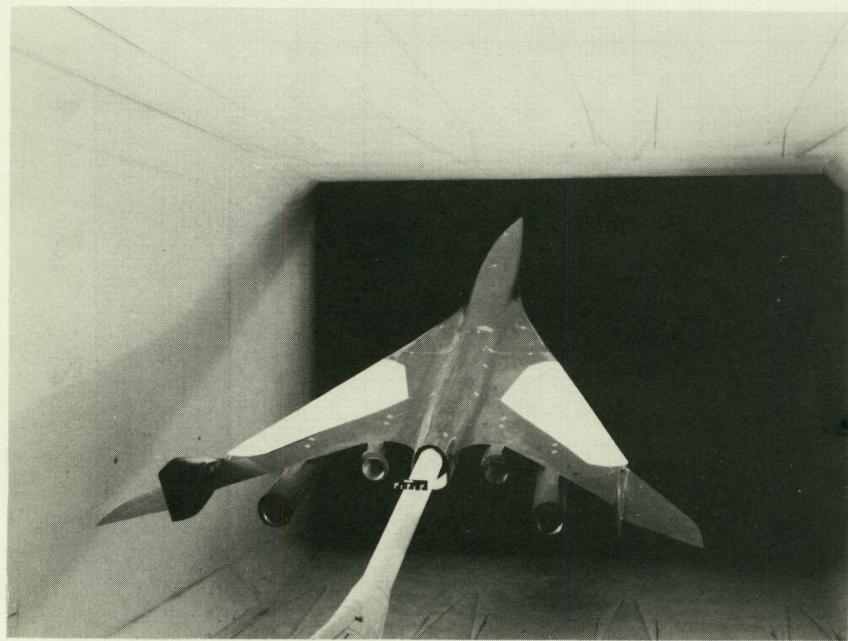
Figure 6.- Twist distribution of the wing leading-edge slat.

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(a) $\Lambda = 25^\circ$.

L-63-2445



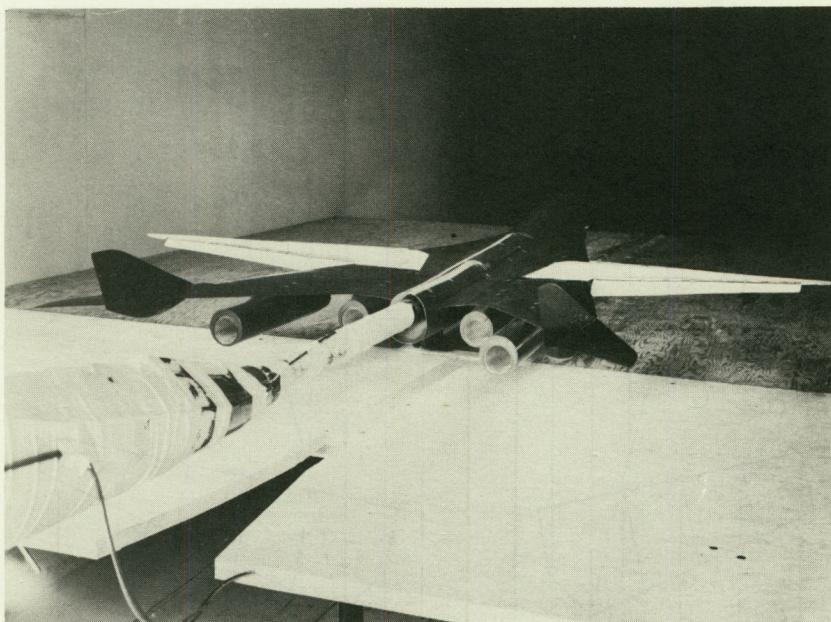
(b) $\Lambda = 75^\circ$.

L-63-2444

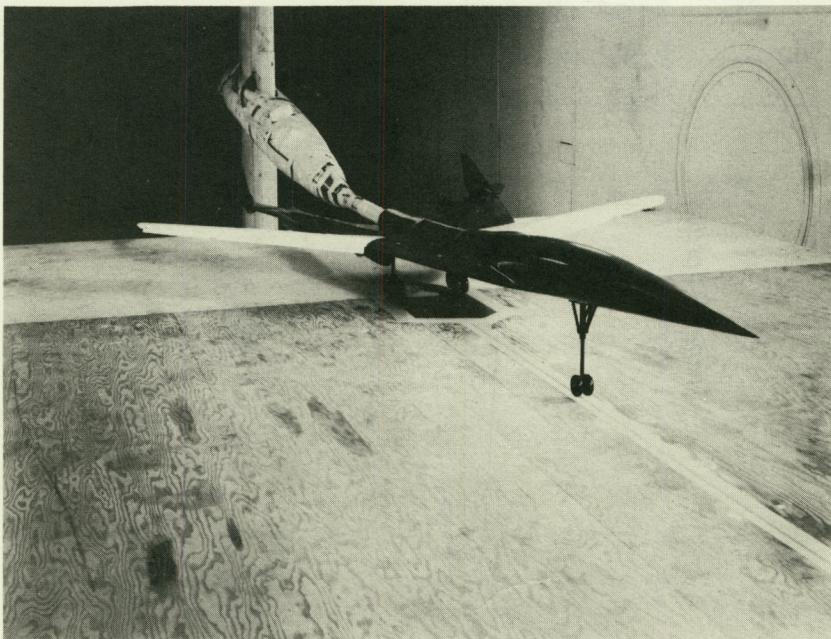
Figure 7.- Photographs of model in the Langley high-speed 7- by 10-foot tunnel.

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L-63-2446



L-63-2447

Figure 8.- Photographs of model and ground board in the Langley high-speed 7- by 10-foot tunnel.

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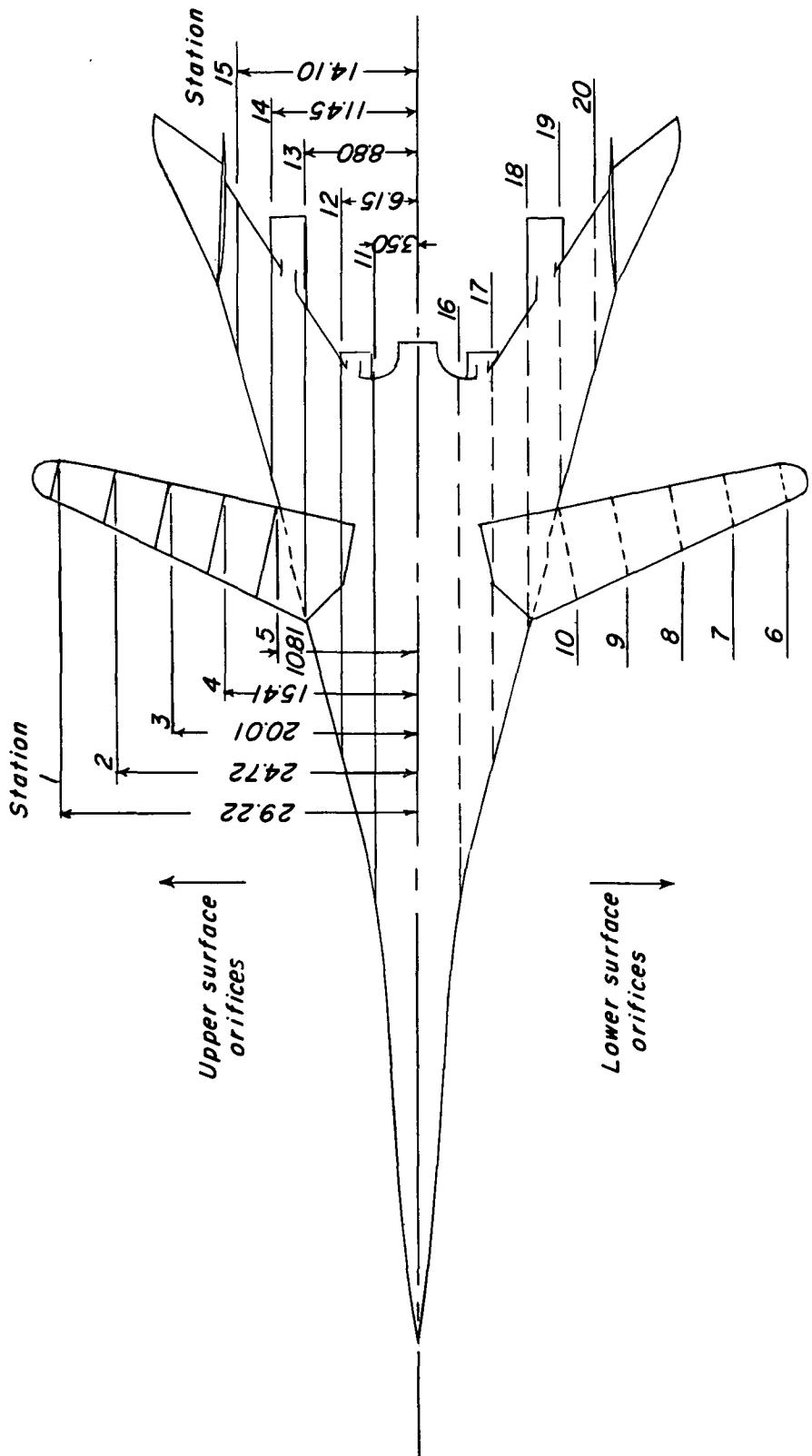


Figure 9.- Drawing showing location of pressure orifices on the fixed and auxiliary wing panels.

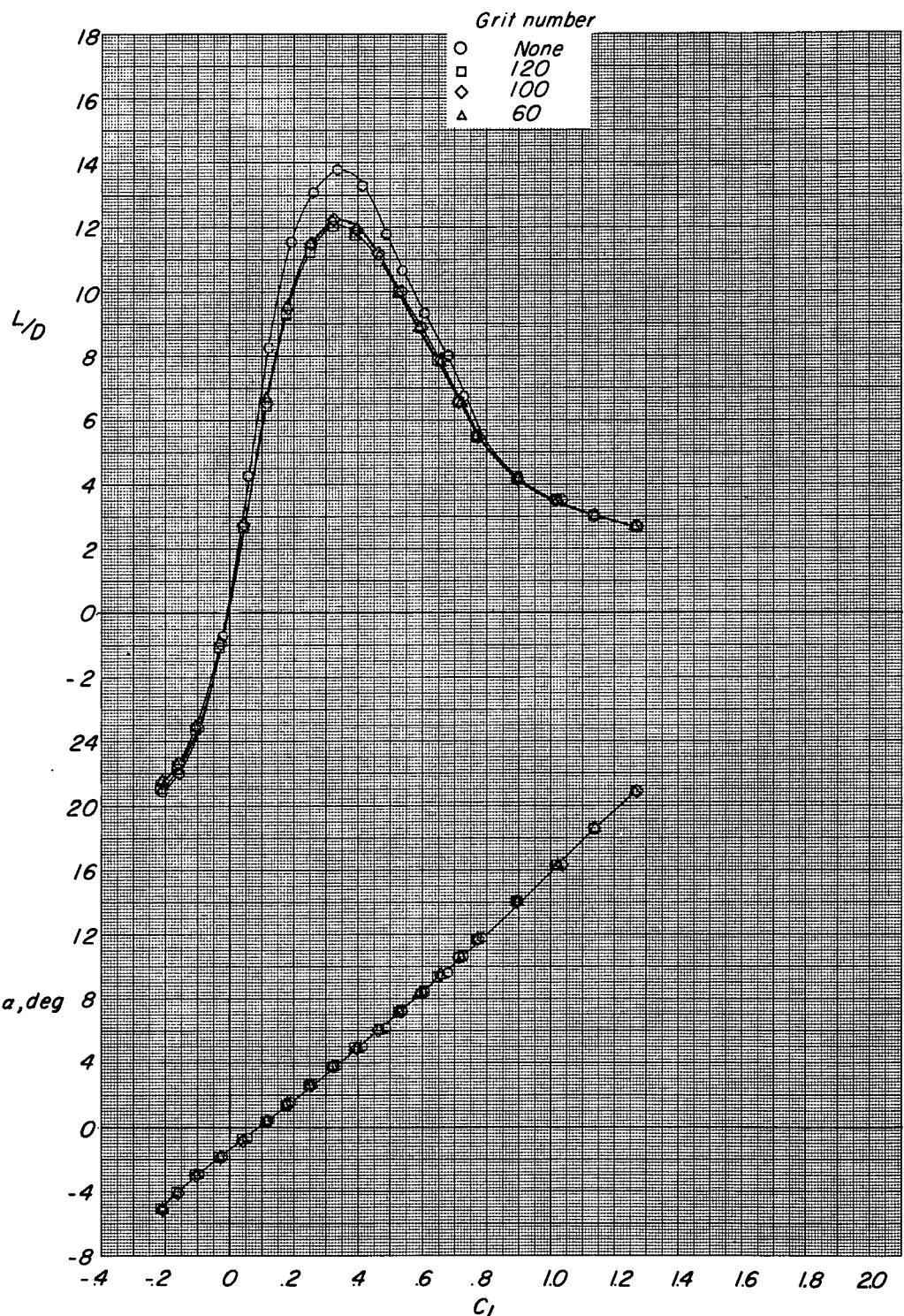


Figure 10.- Effect of transition grit size on the longitudinal aerodynamic characteristics.
WBNH₁V1; $\Delta = 25^\circ$; $i_{t,R} = 0^\circ$; $i_{t,L} = 0^\circ$.

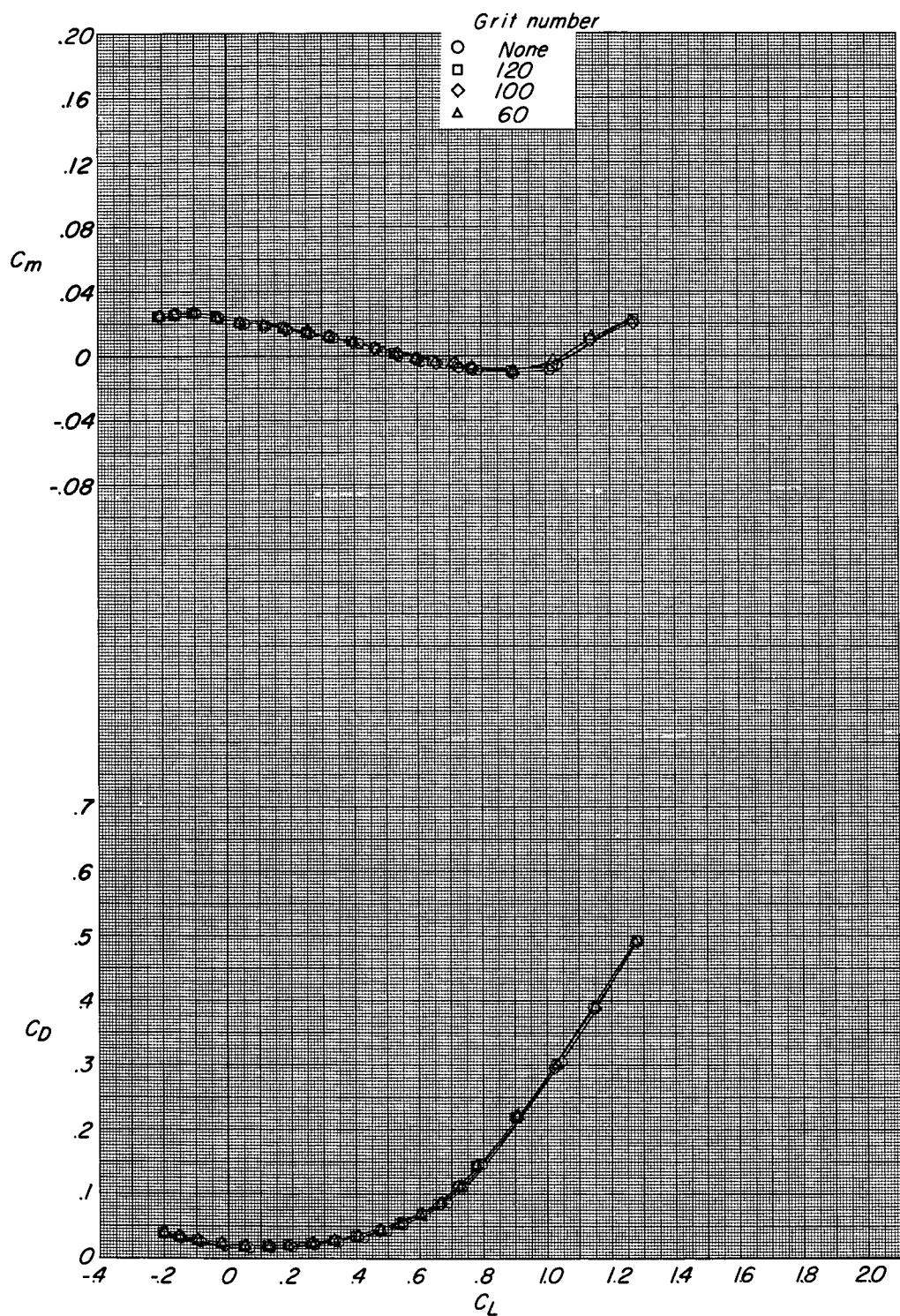


Figure 10.- Concluded.

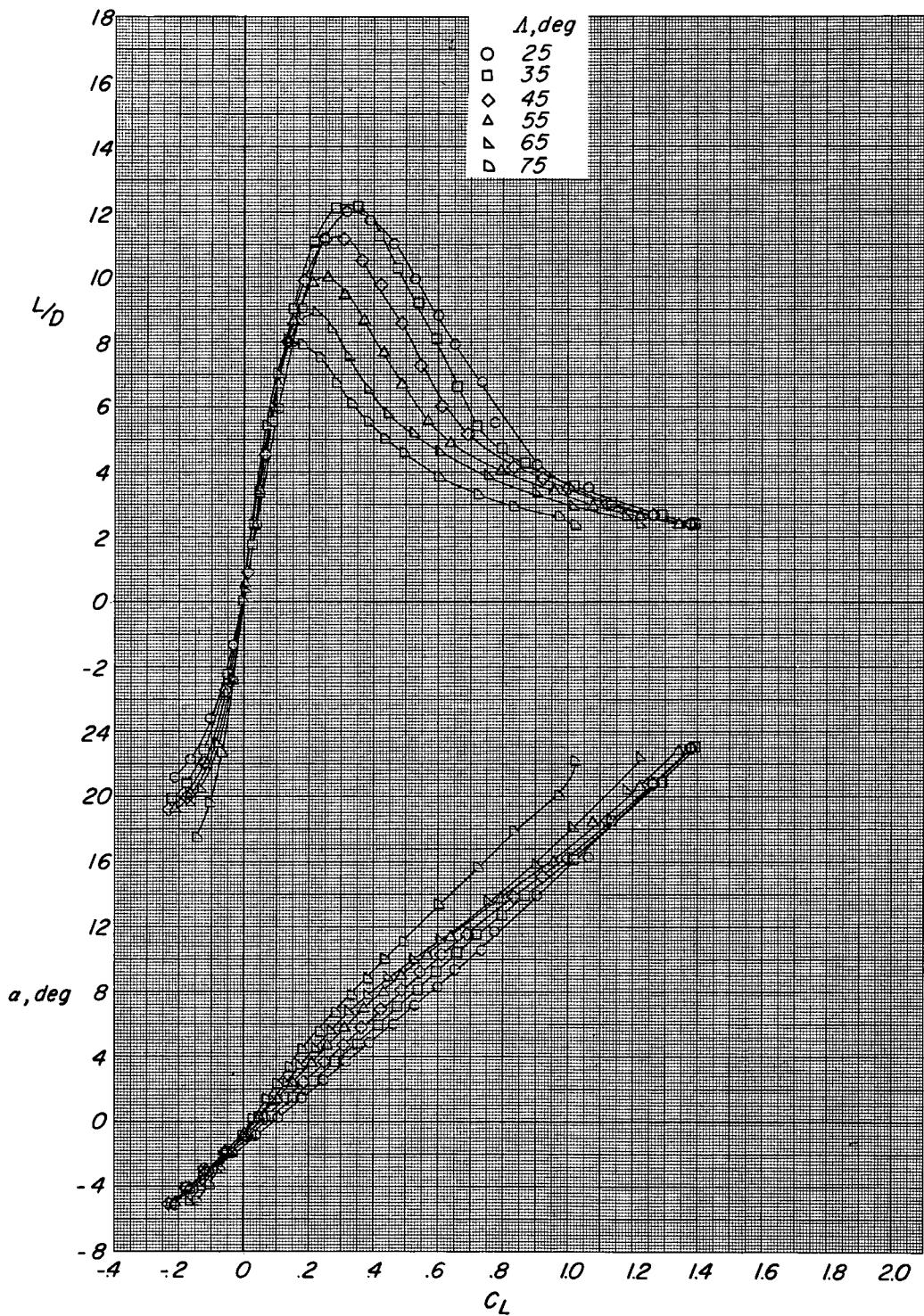


Figure 11.- Effect of wing leading-edge sweep angle on the longitudinal aerodynamic characteristics. WBNH₁V₁; $i_{t,R} = 0.32^\circ$; $i_{t,L} = 0.42^\circ$.

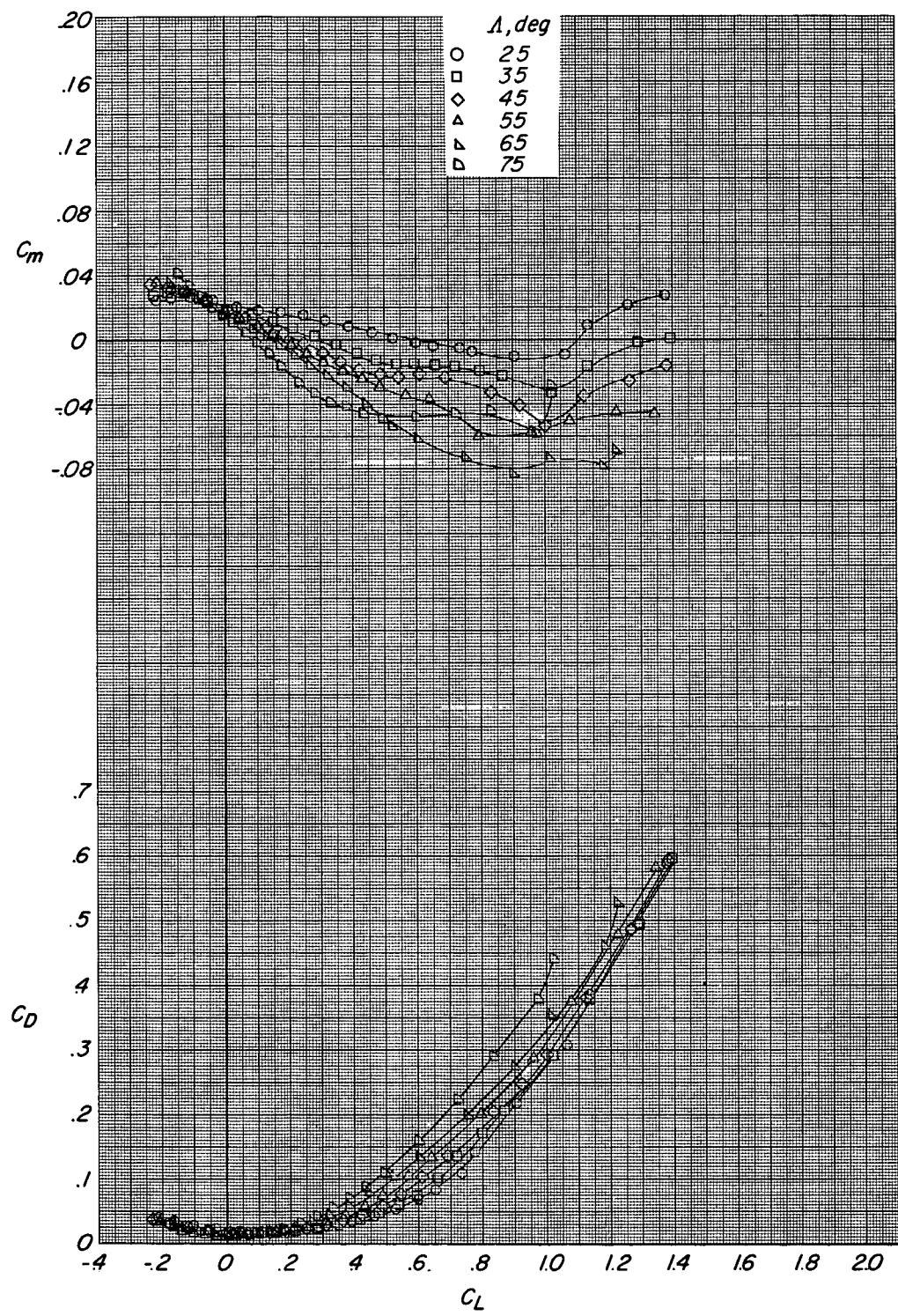


Figure 11.- Concluded.

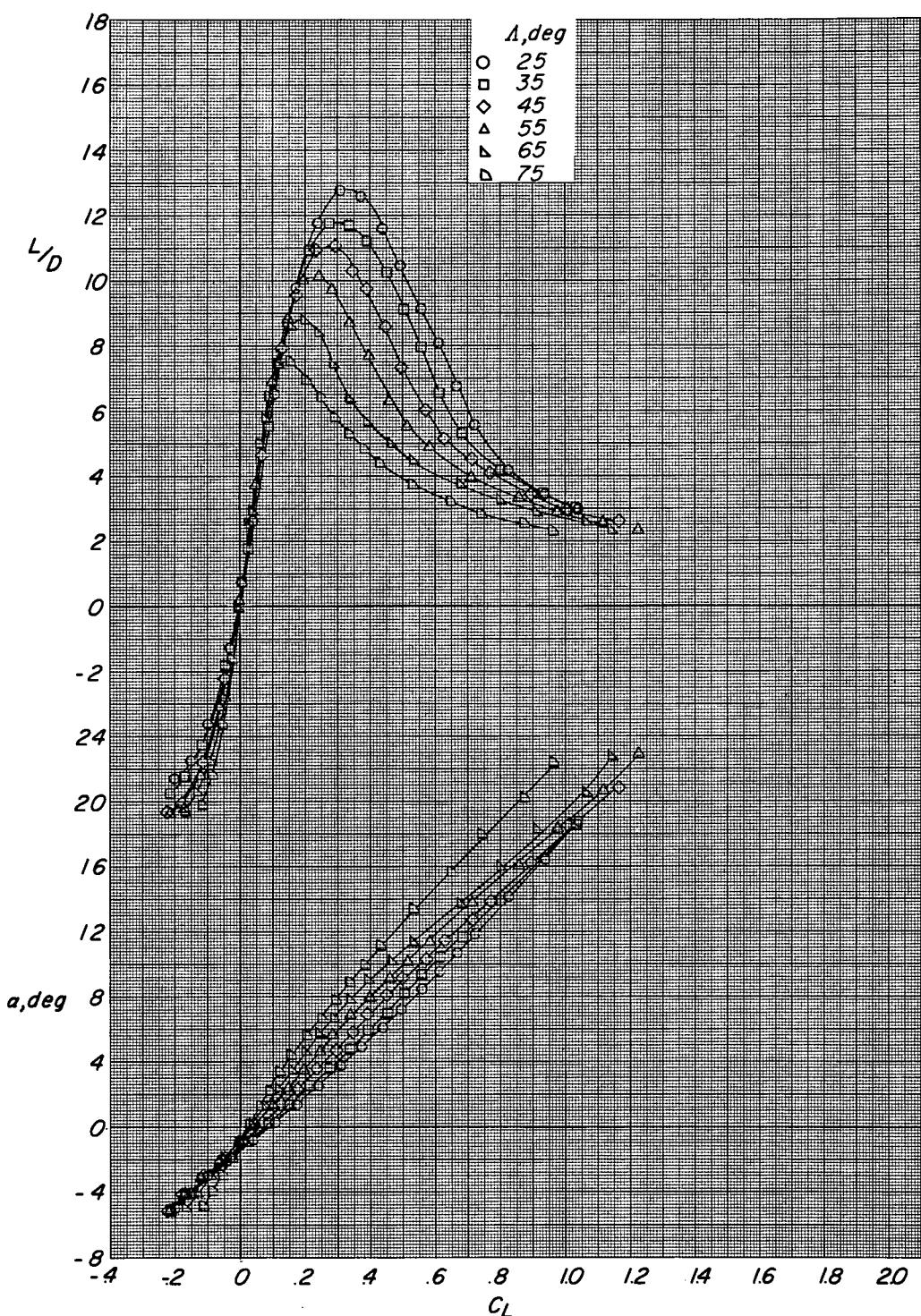


Figure 12.- Effect of wing leading-edge sweep angle on the longitudinal aerodynamic characteristics of the configuration without the horizontal tail. WBNV₁.

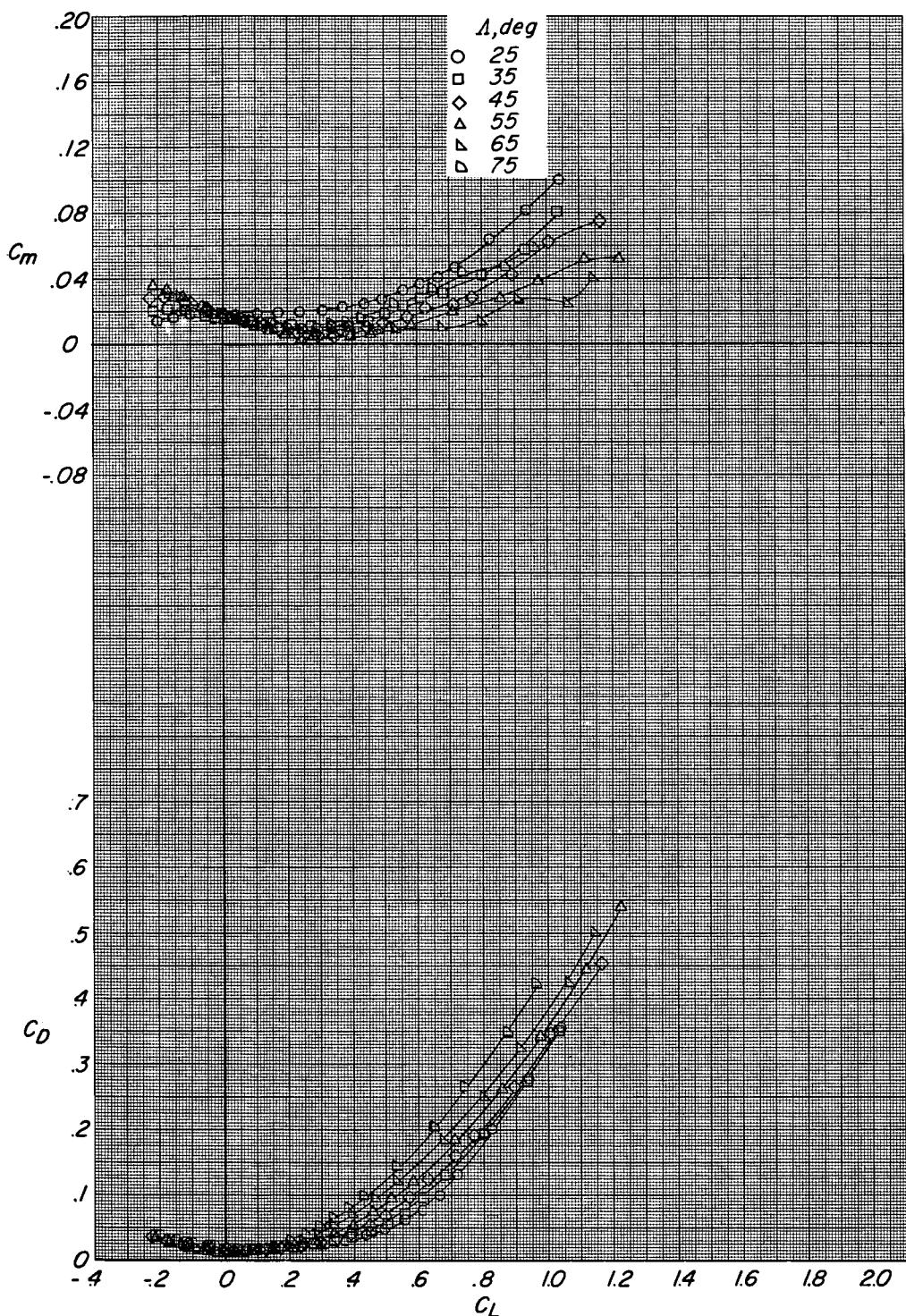


Figure 12.- Concluded.

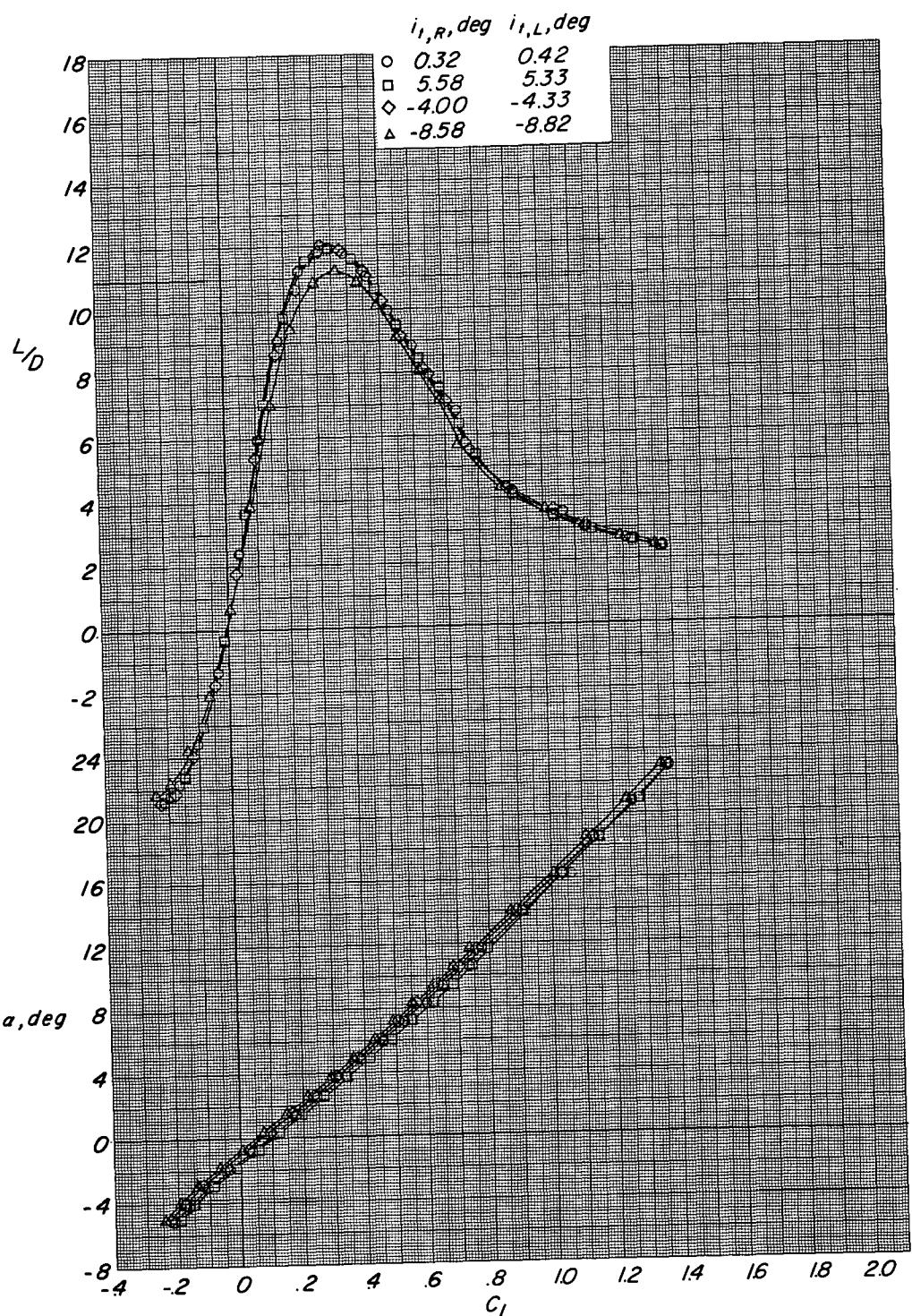


Figure 13.- Effect of horizontal-tail incidence angle on the longitudinal aerodynamic characteristics. WBNH₁V₁; $\Lambda = 25^\circ$.

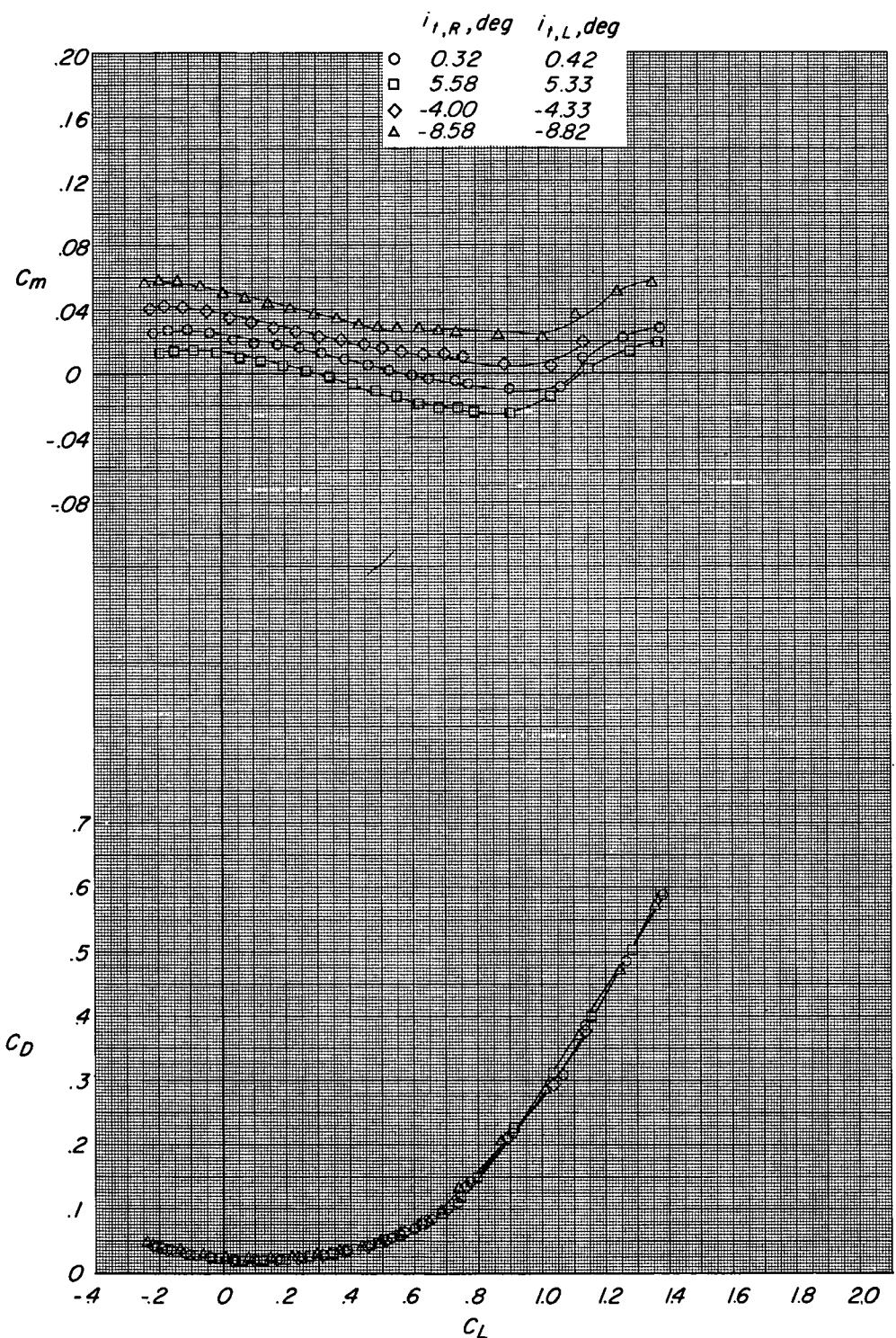


Figure 13.- Concluded.

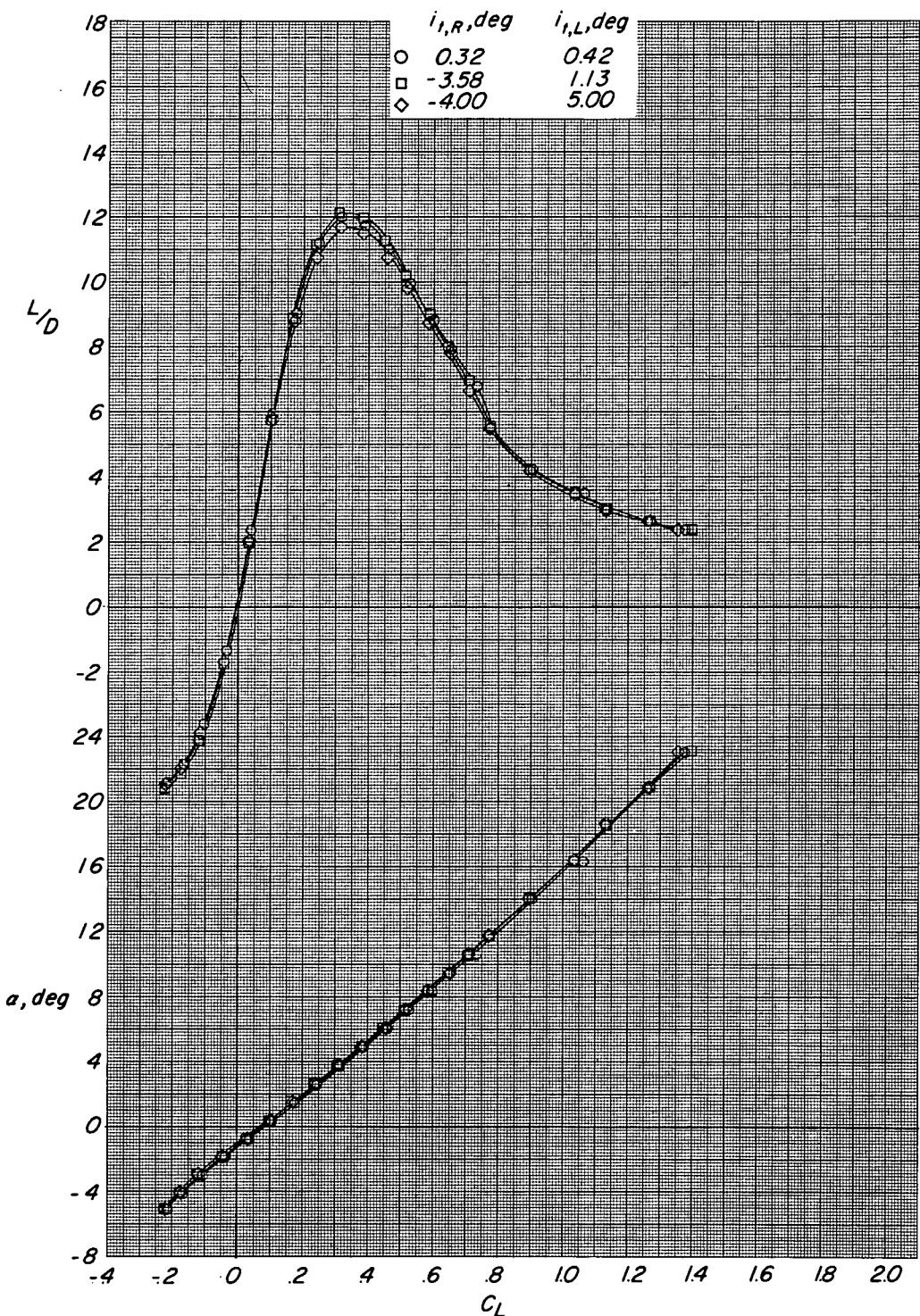


Figure 14.- Effect of differential incidence angles of the horizontal tails on the longitudinal aerodynamic characteristics. WBNH₁V₁; $\Lambda = 25^\circ$.

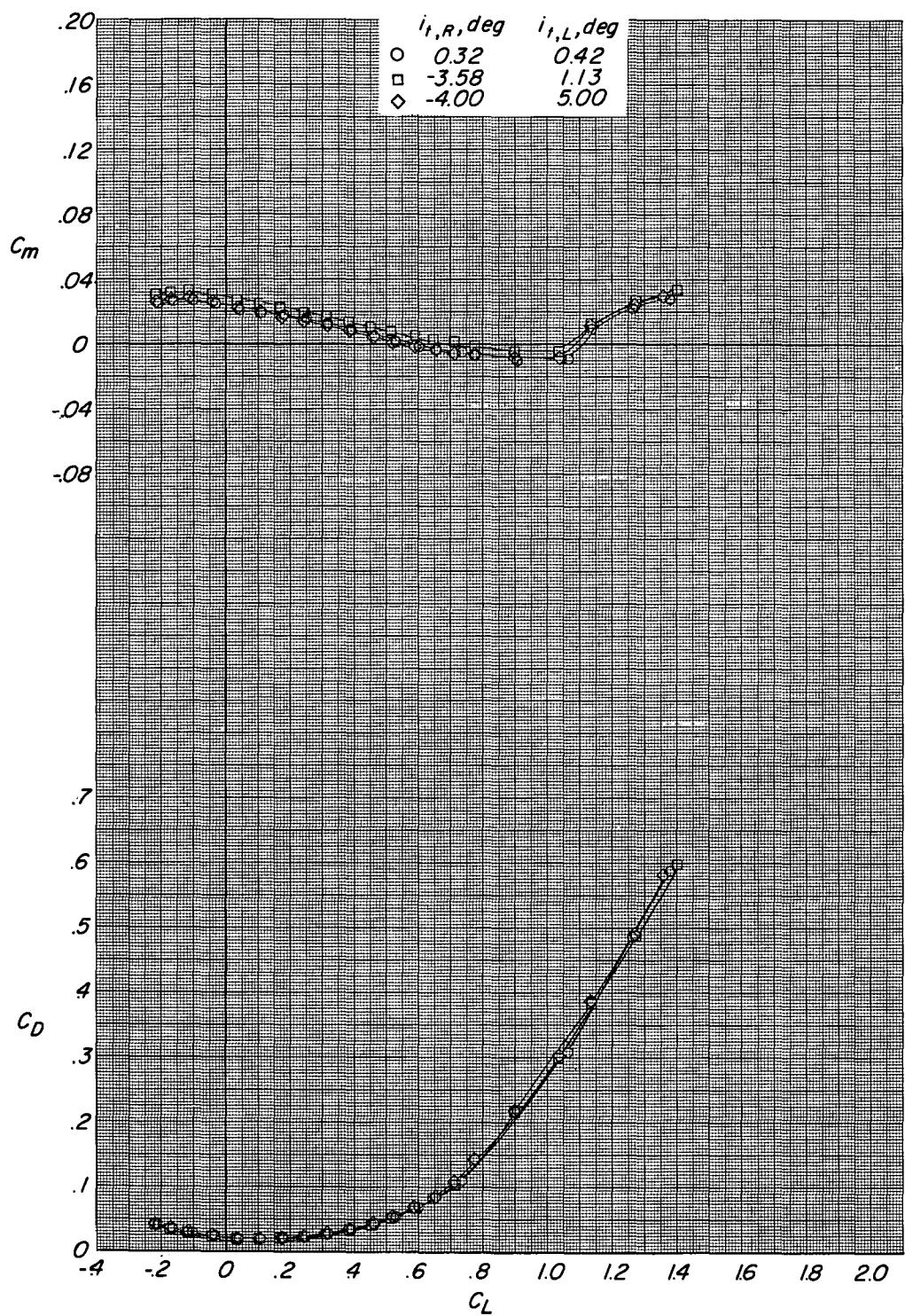


Figure 14.- Concluded.

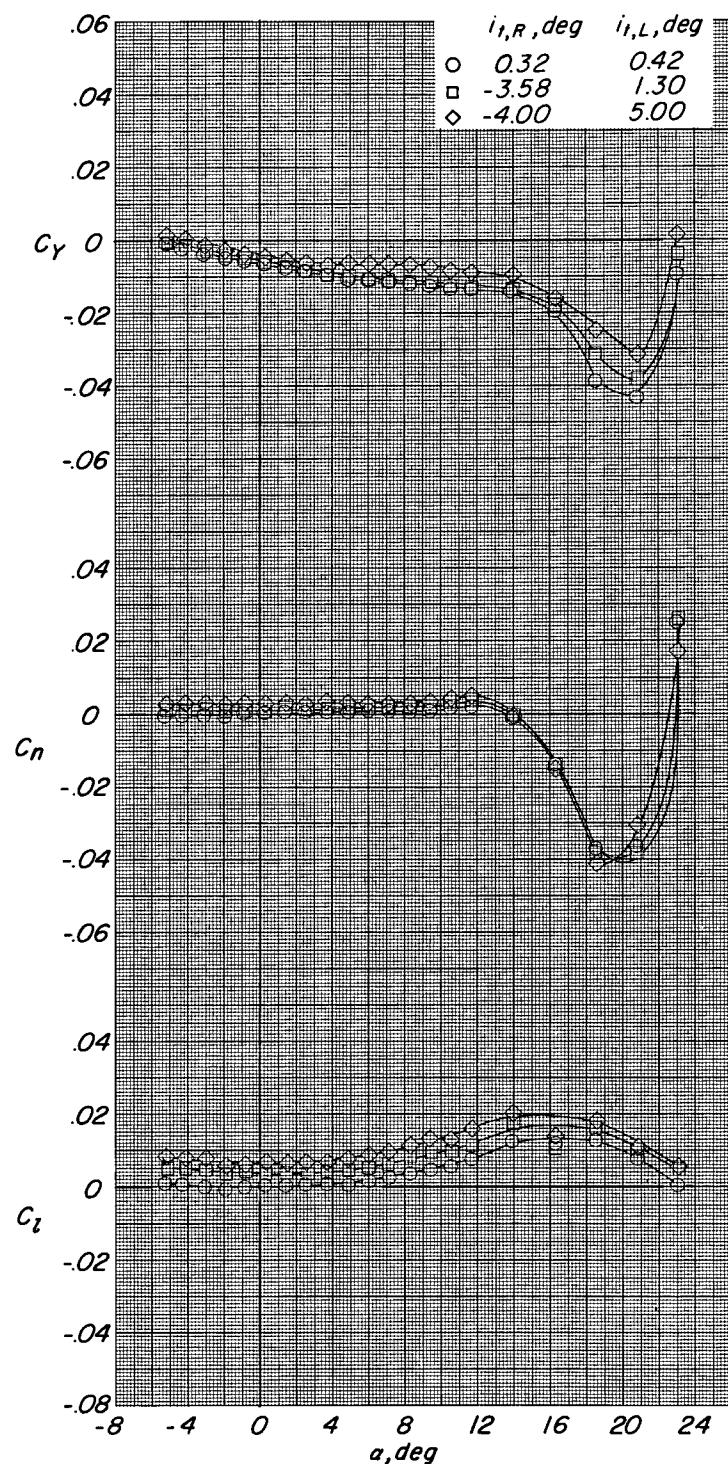


Figure 15.- Effect of differential incidence angles of the horizontal tail on the lateral aerodynamic characteristics. WBNH₁V₁; $\Lambda = 25^\circ$.

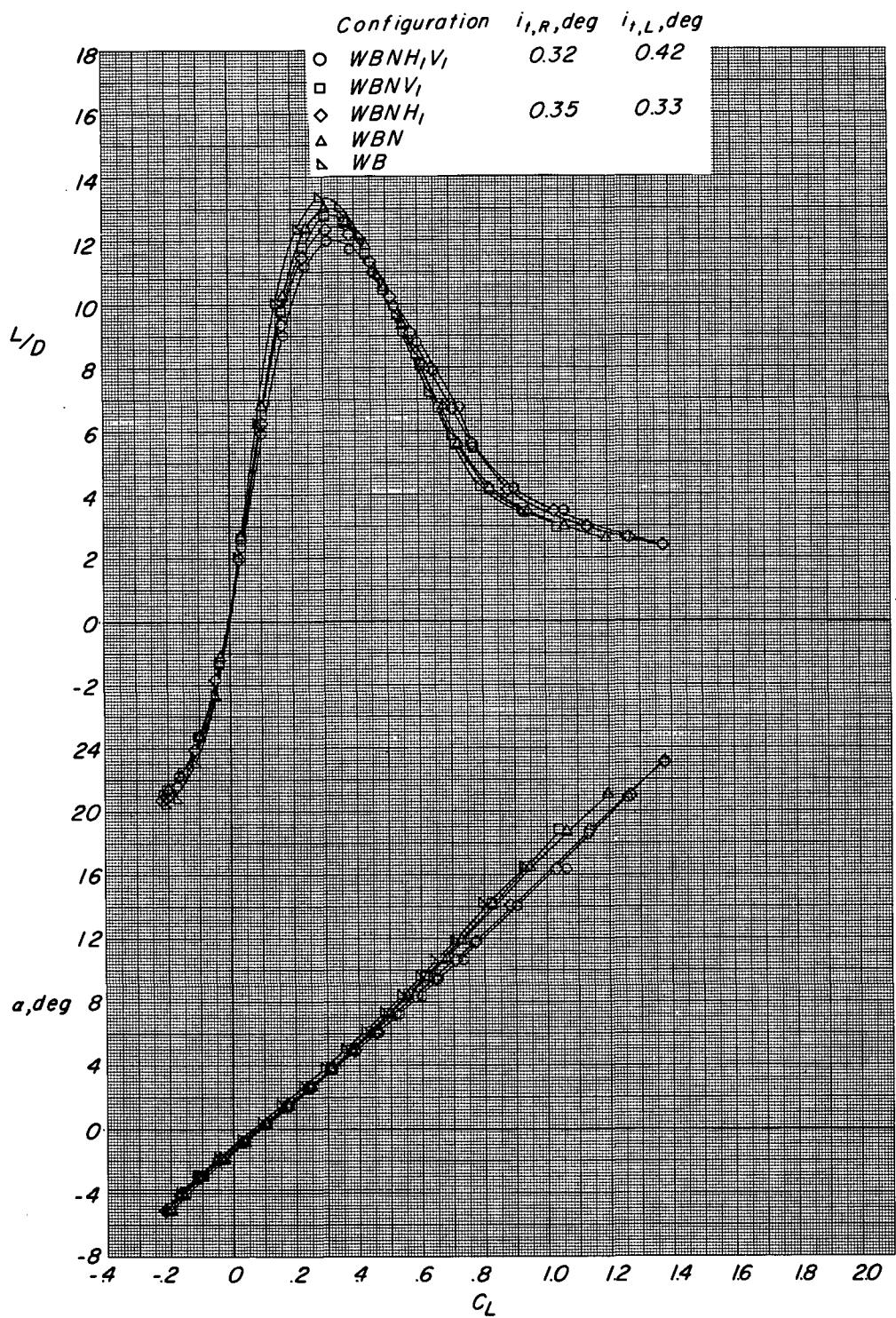


Figure 16.- Effect of model components on the longitudinal aerodynamic characteristics. $\Lambda = 25^\circ$.

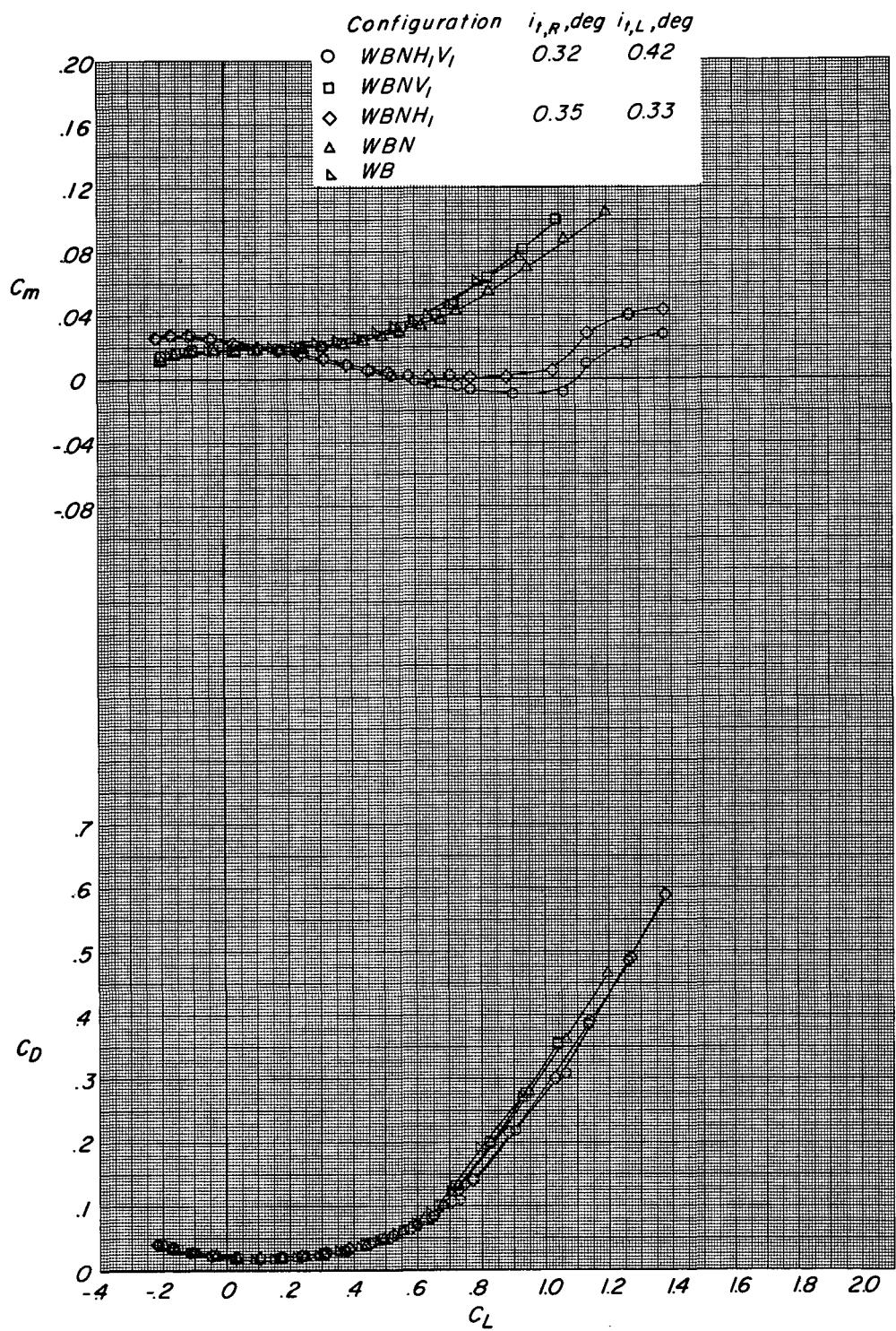


Figure 16.- Concluded.

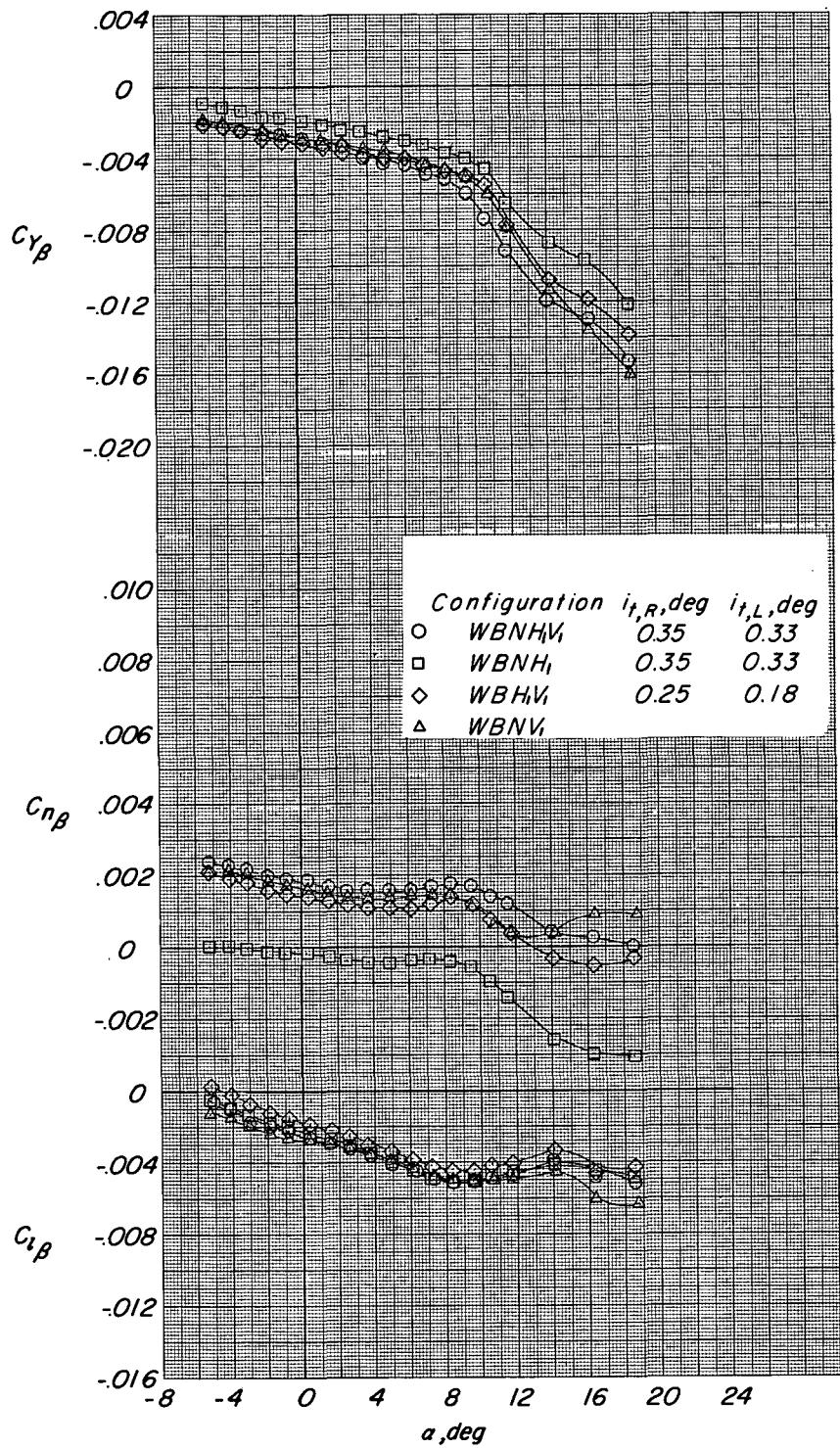


Figure 17.- Effect of model components on the lateral stability derivatives. $\Delta = 25^\circ$.

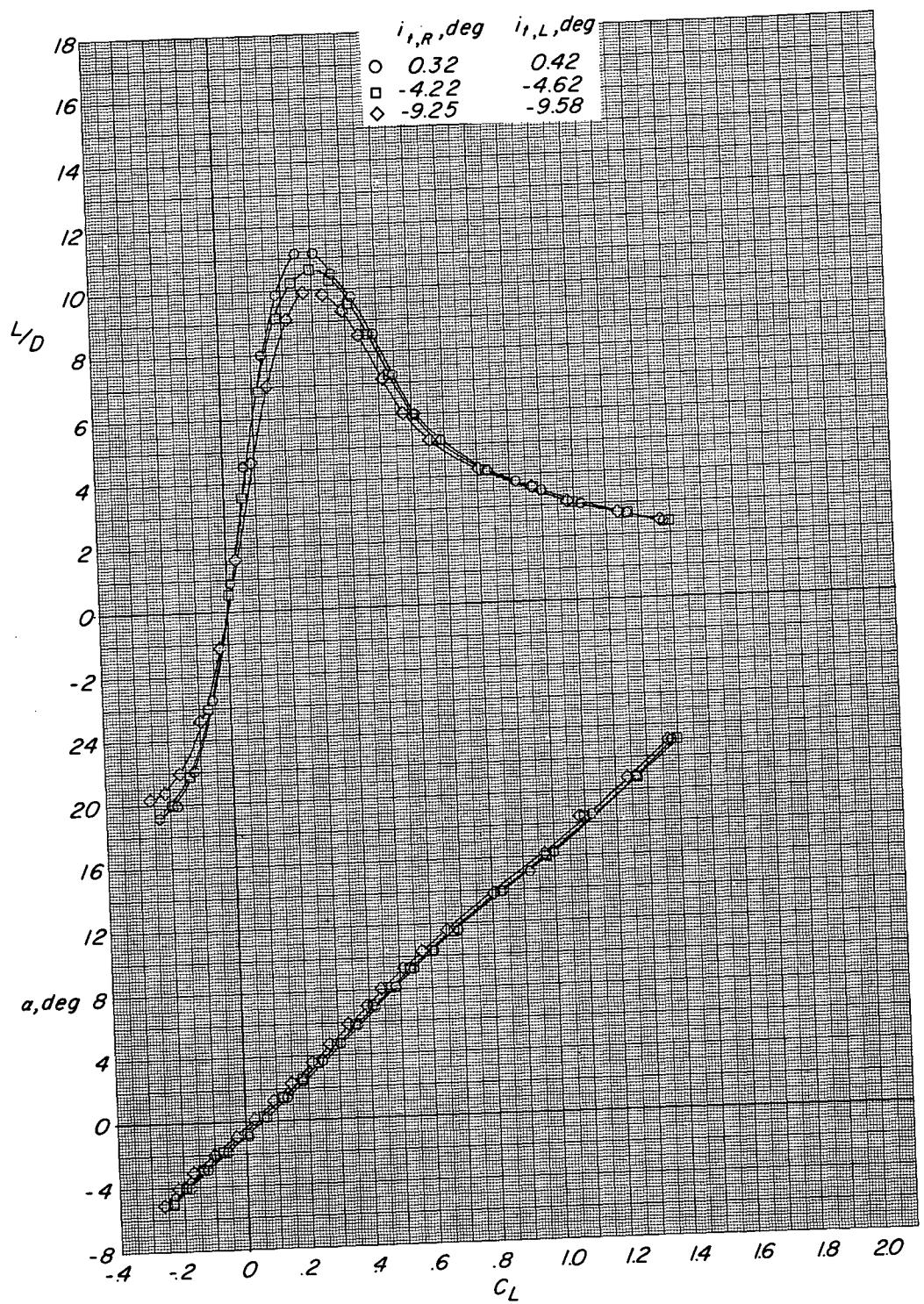


Figure 18.- Effect of horizontal-tail incidence angle on the longitudinal aerodynamic characteristics with the auxiliary wing panels swept 45° . WBNH₁V₁.

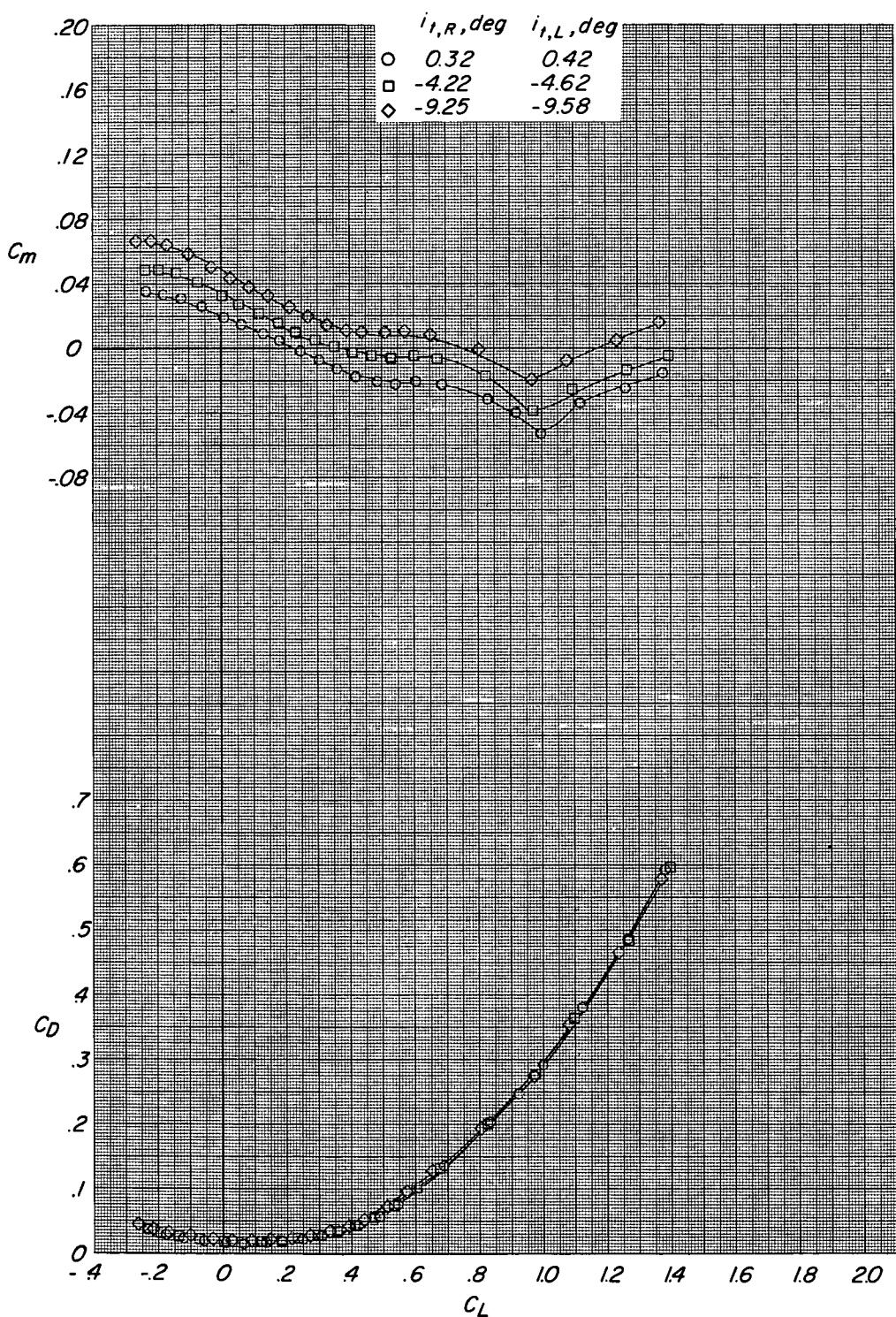


Figure 18.- Concluded.

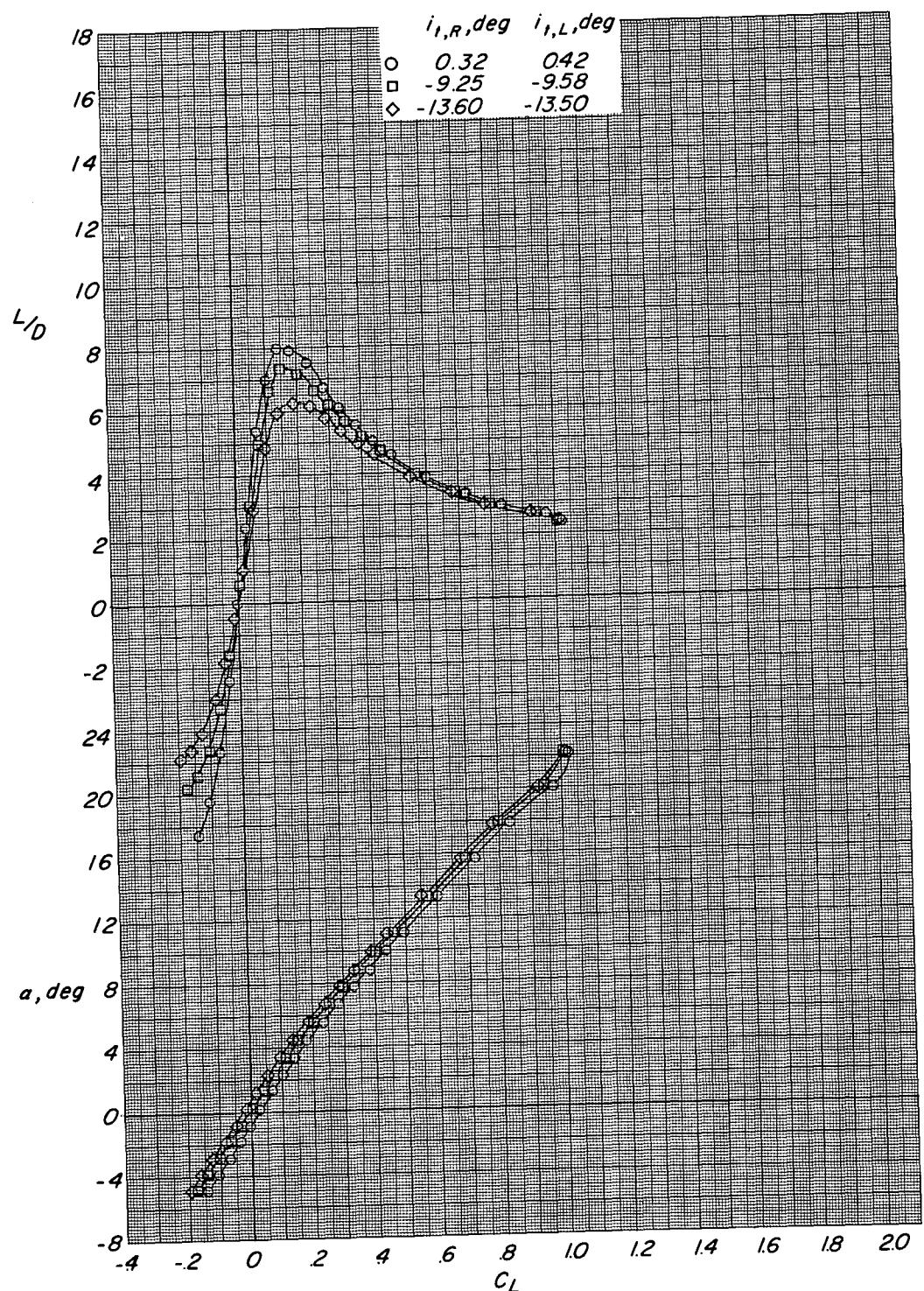


Figure 19.- Effect of horizontal-tail incidence angle on the longitudinal aerodynamic characteristics with the auxiliary wing panels swept 75° . WBNH₁V1.

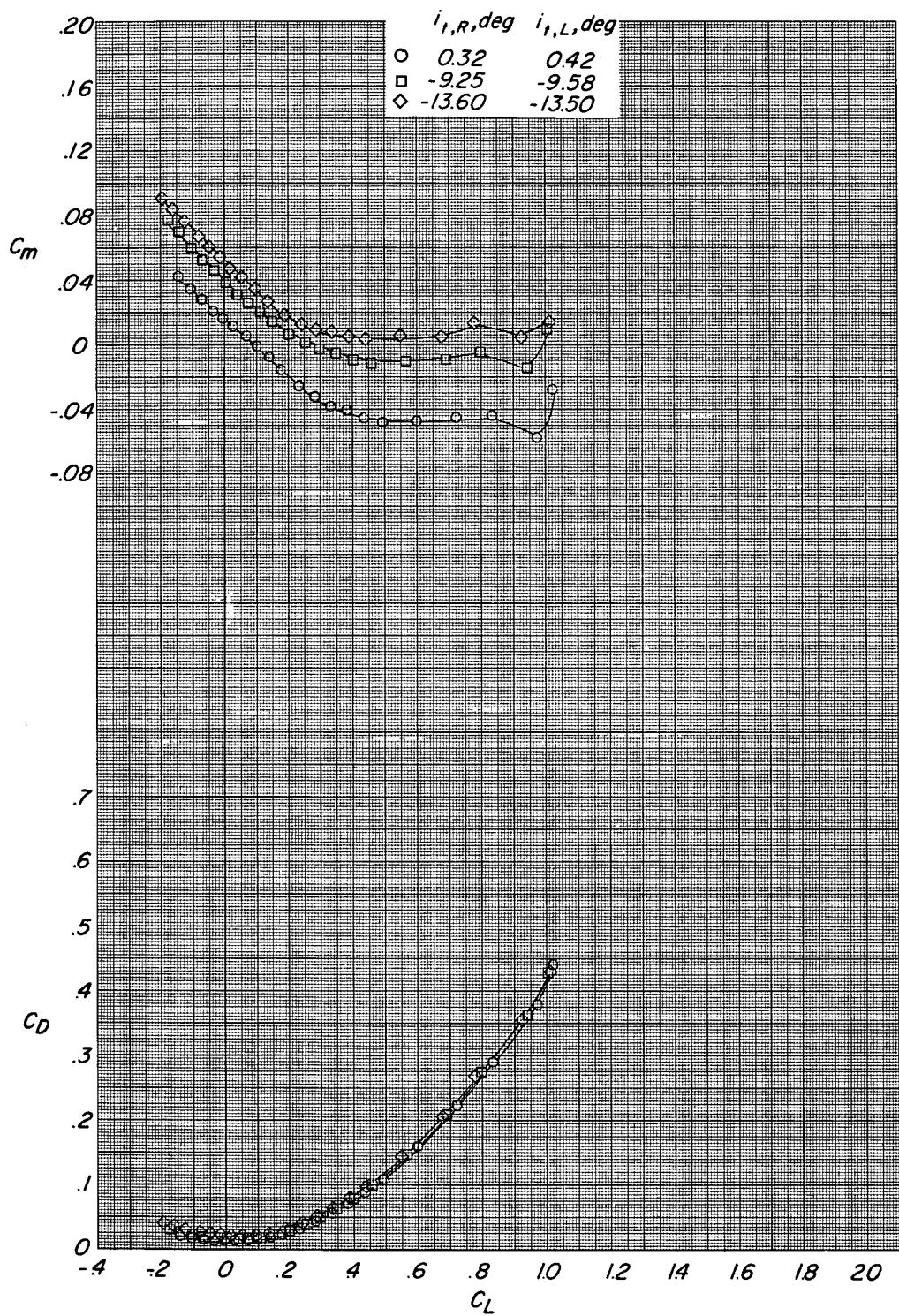


Figure 19.- Concluded.

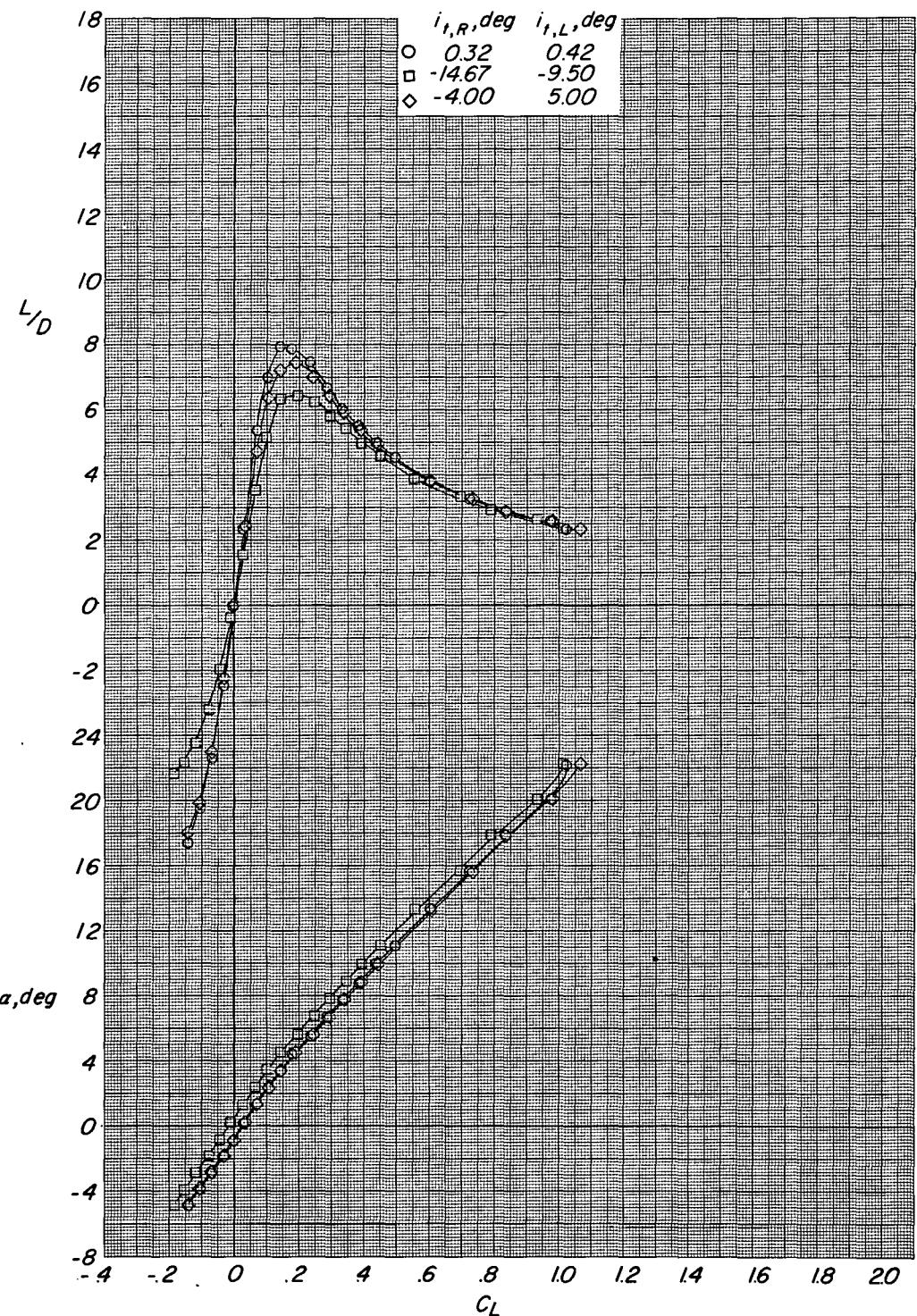


Figure 20.- Effect of differential incidence angles of the horizontal tails on the longitudinal aerodynamic characteristics. WBNH₁V₁; $\Lambda = 75^\circ$.

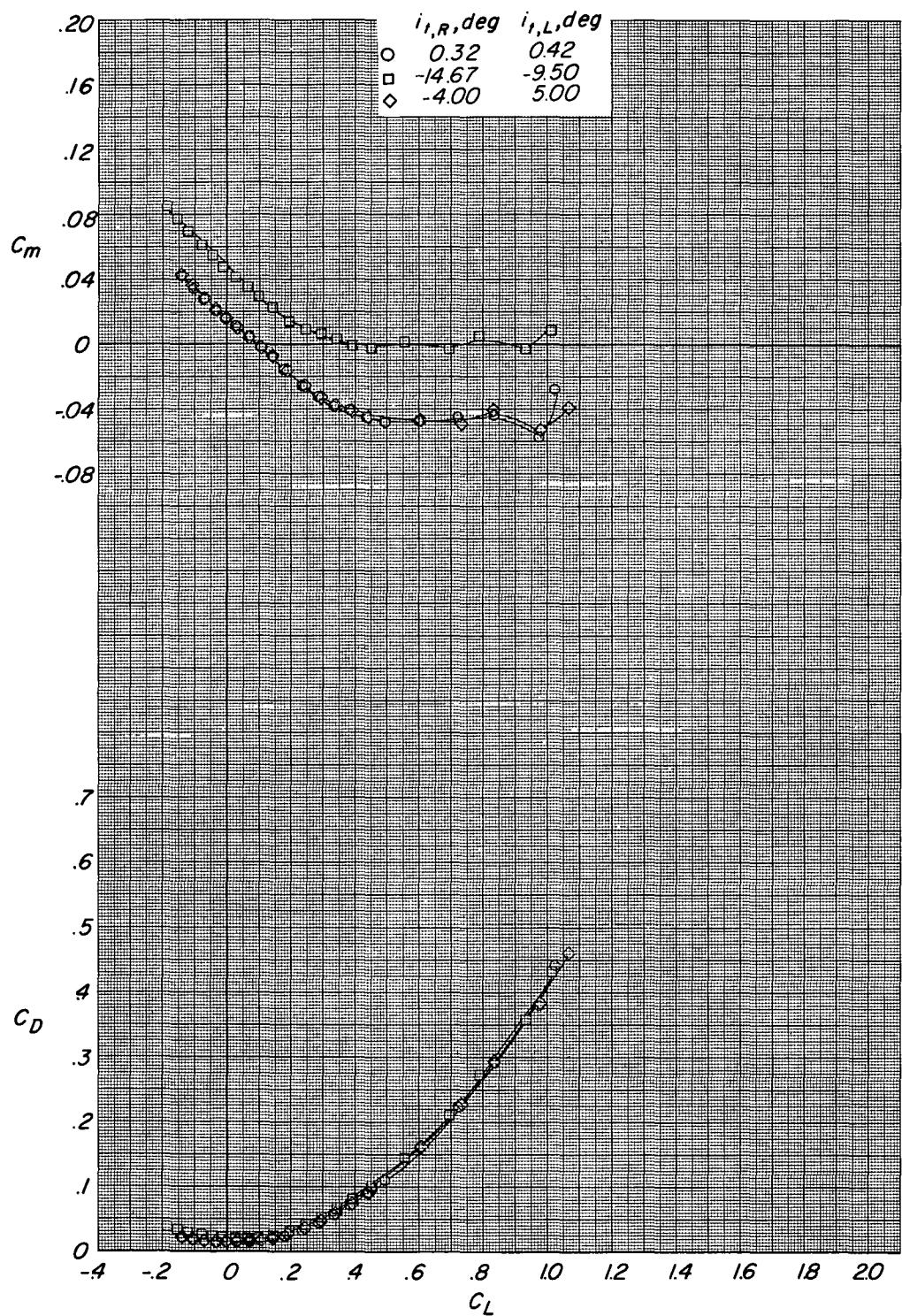


Figure 20.- Concluded.

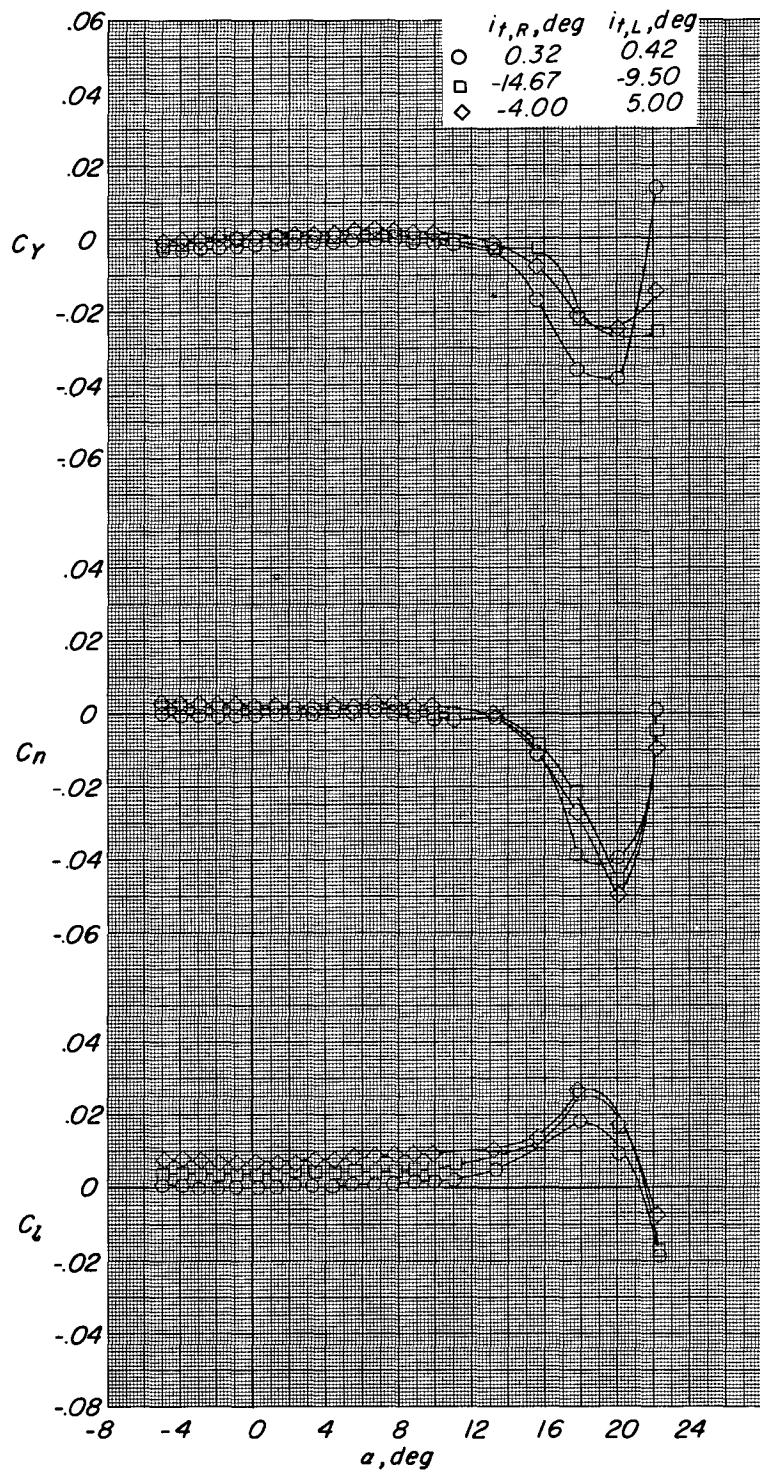


Figure 21.- Effect of differential incidence angles of the horizontal tails on the lateral aerodynamic characteristics. WBNH₁V₁; $\Lambda = 75^\circ$.

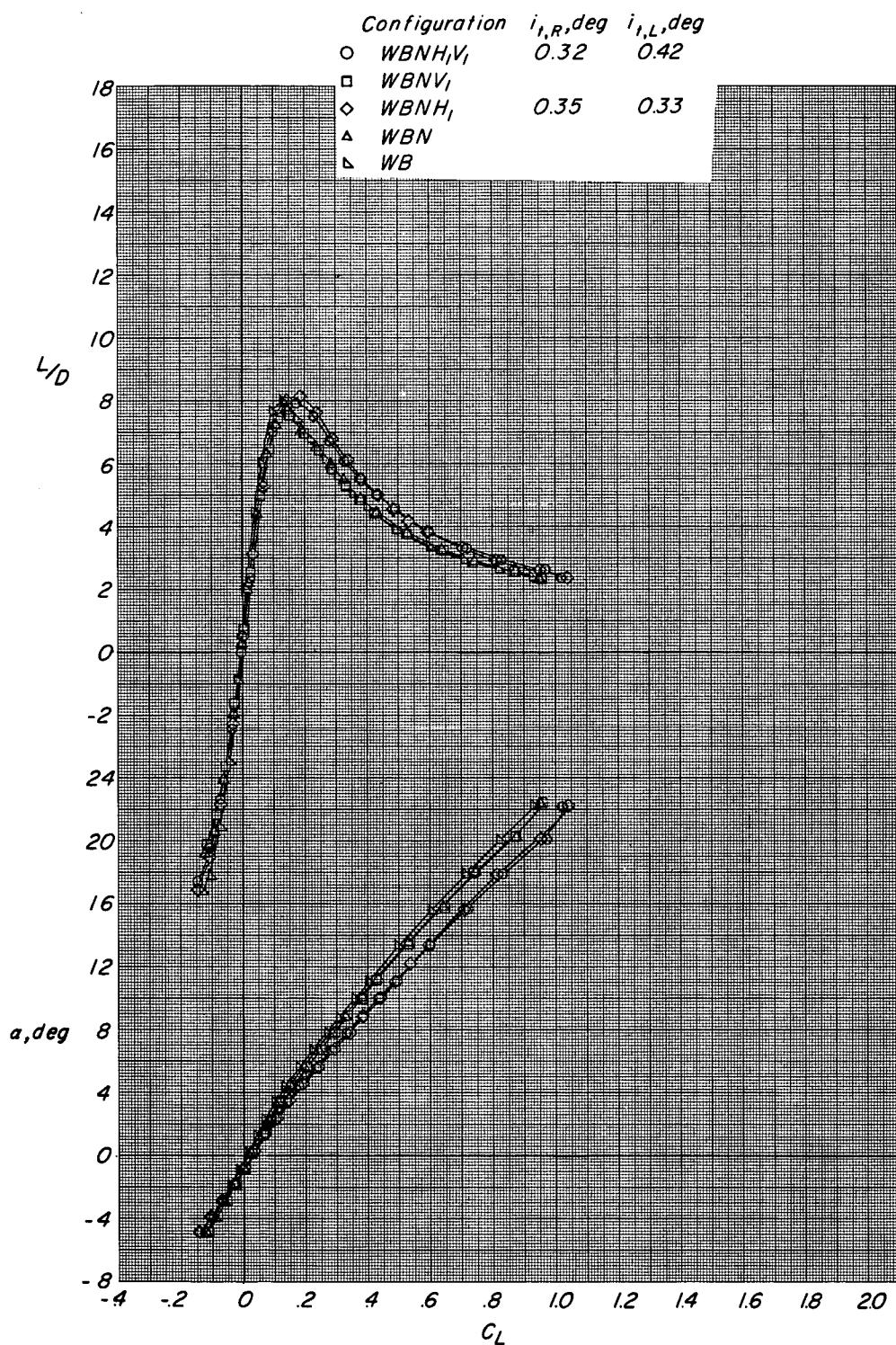


Figure 22.- Effect of model components on the longitudinal aerodynamic characteristics. $\Lambda = 75^\circ$.

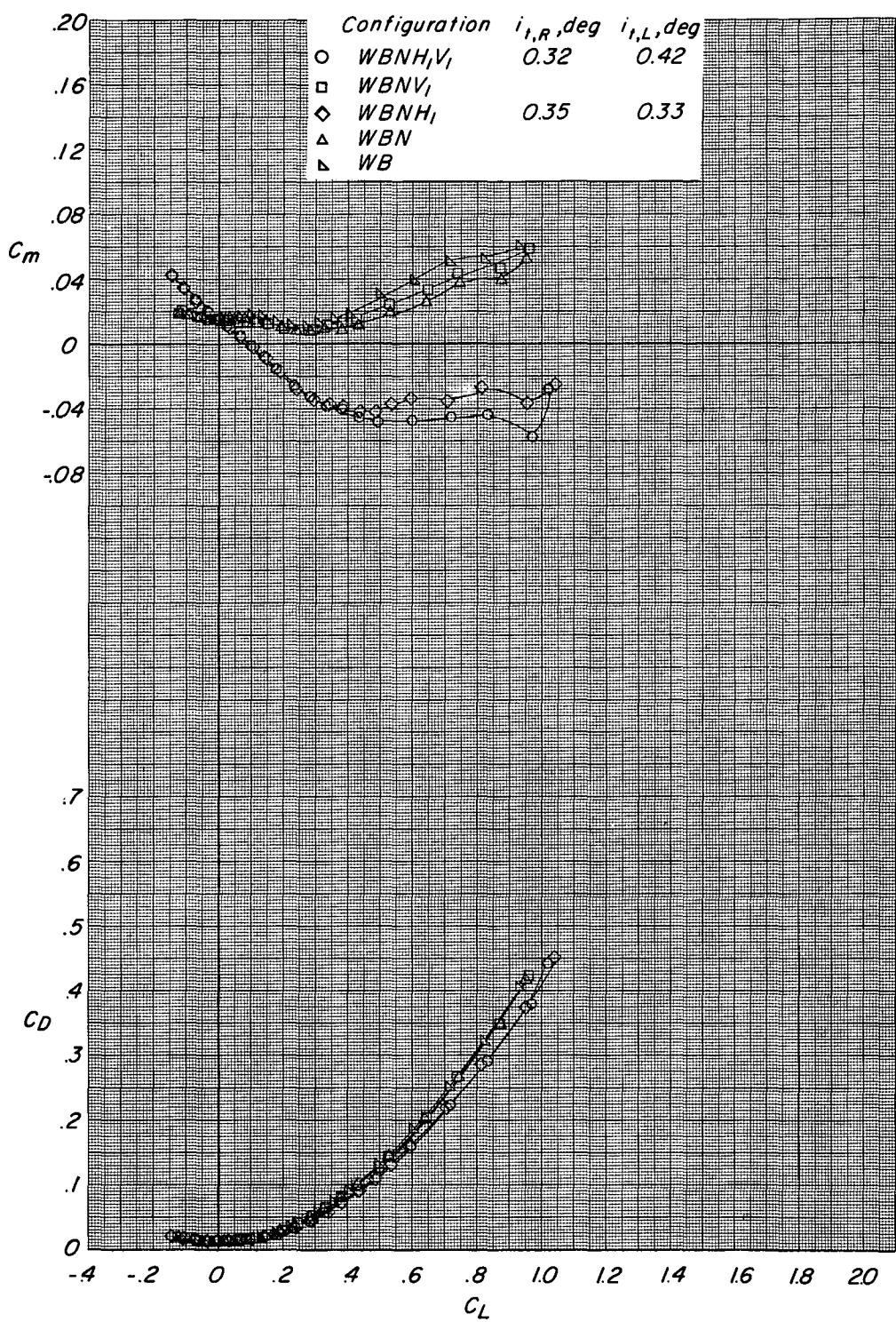


Figure 22.- Concluded.

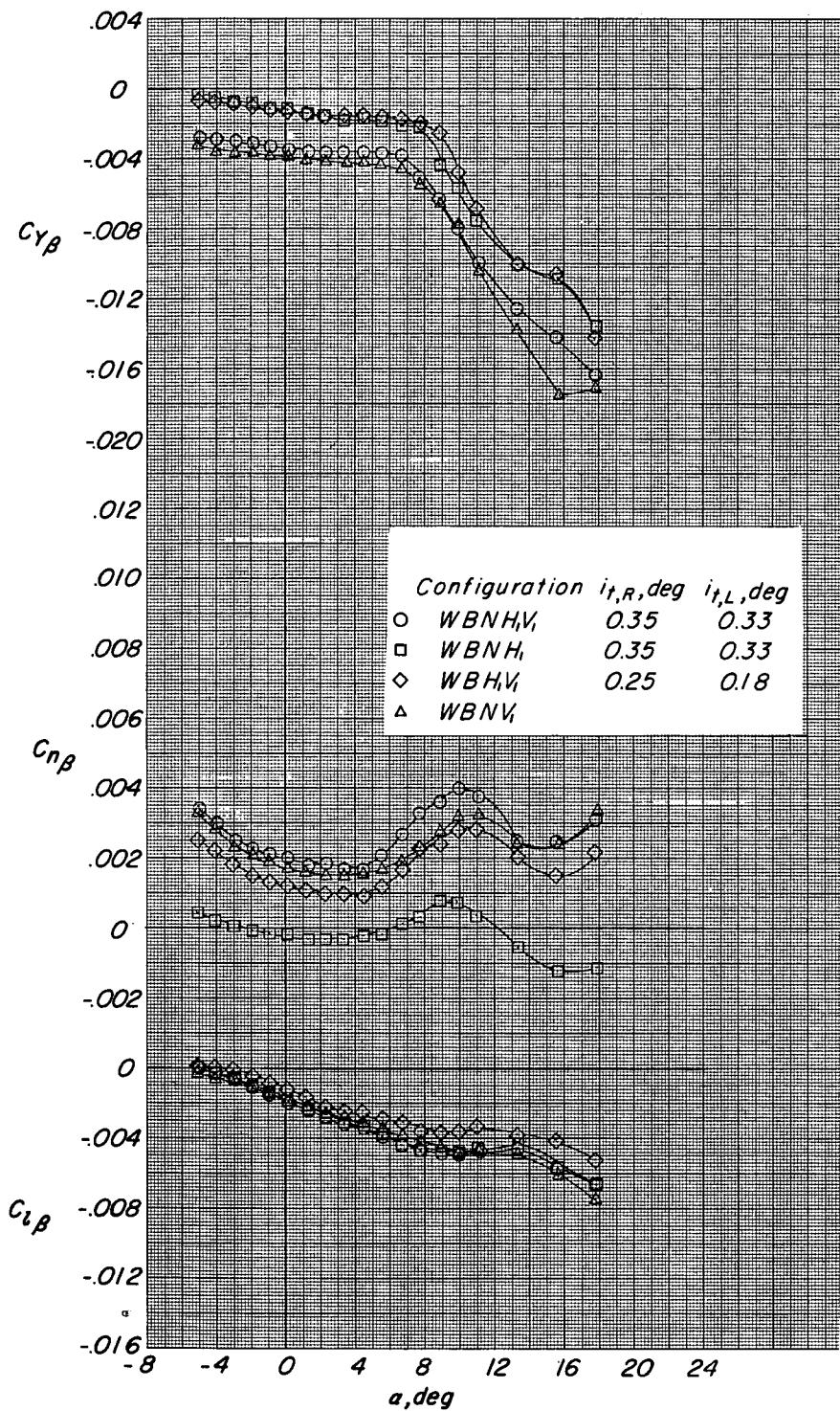


Figure 23.- Effect of model components on the lateral stability derivative. $\Lambda = 75^\circ$.

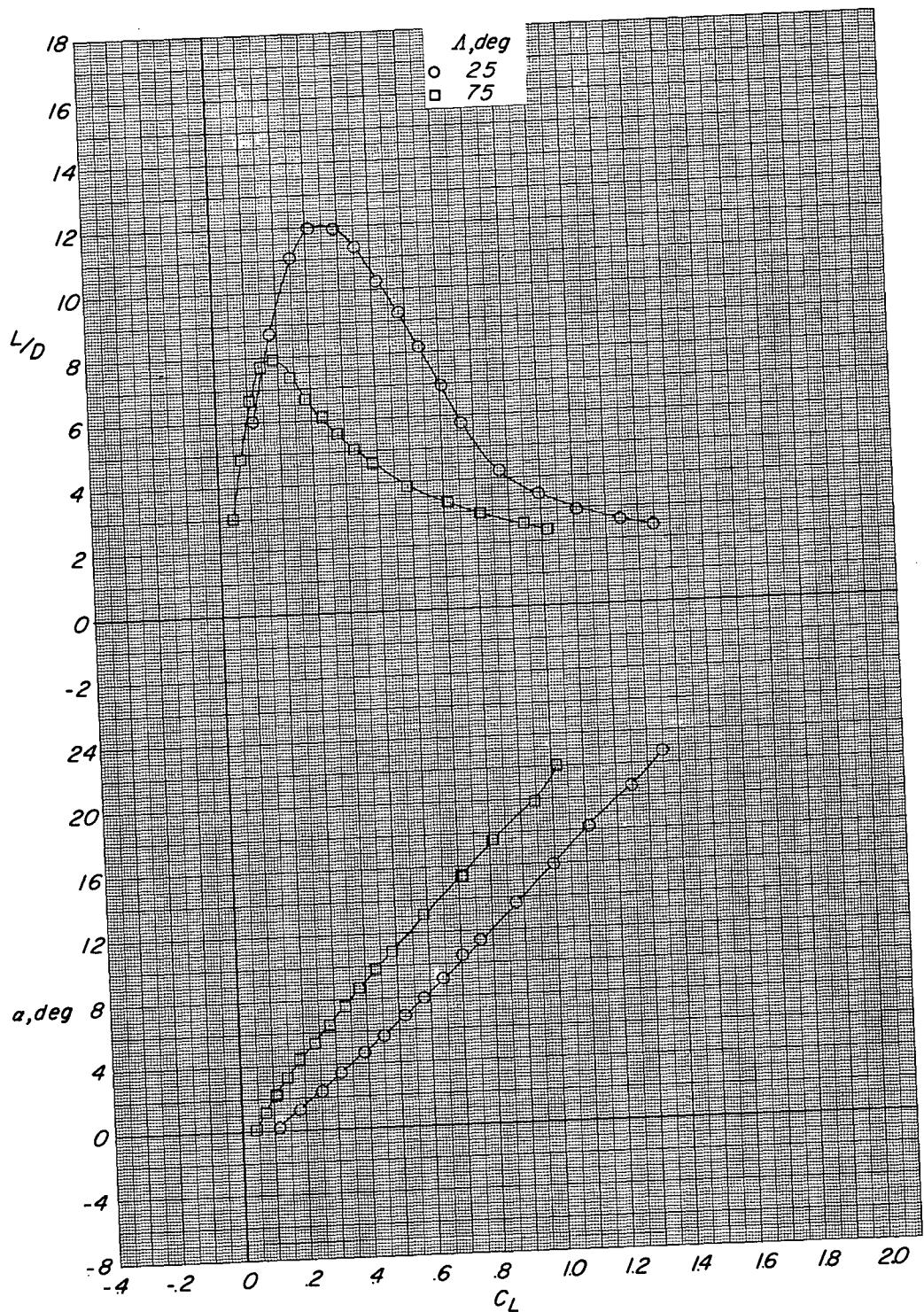


Figure 24.- Effect of wing leading-edge sweep angle on the longitudinal aerodynamic characteristics of the configuration with large vertical tails. WBNH₁V2; $i_{t,R} = 0.47^\circ$; $i_{t,L} = 0.57^\circ$.

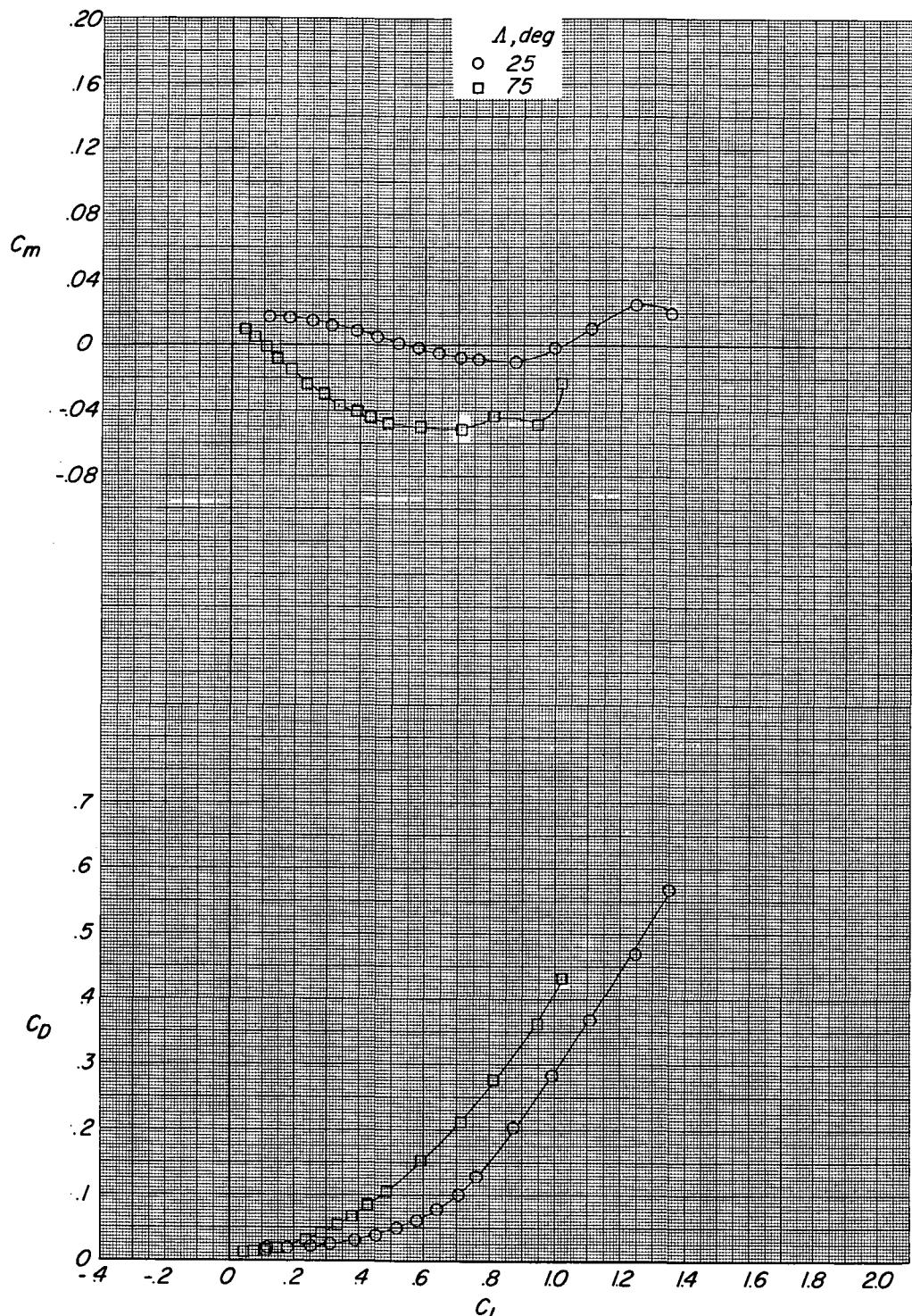


Figure 24.- Concluded.

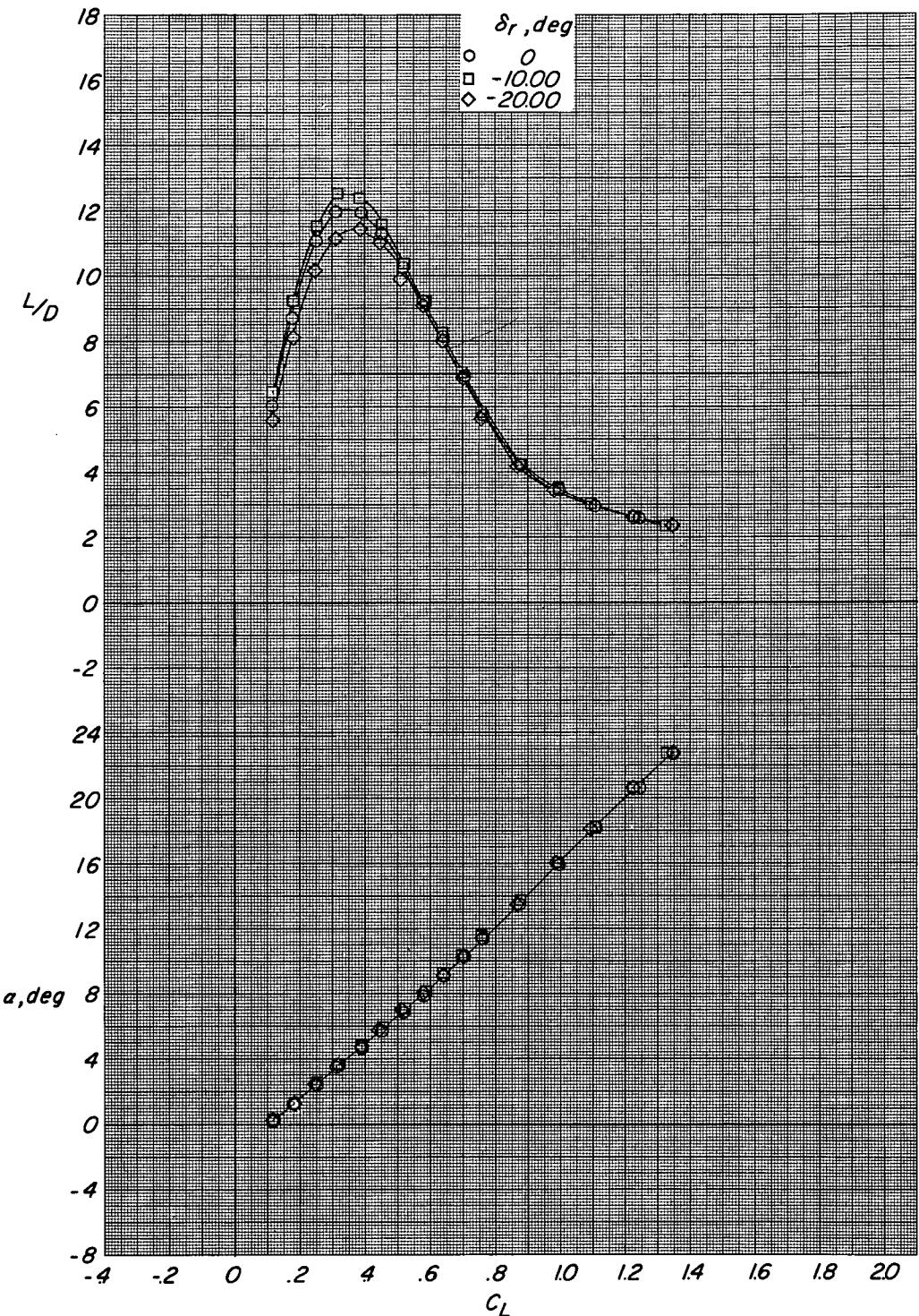


Figure 25.- Effect of rudder deflection angle on the longitudinal aerodynamic characteristics.
WBNH₁V₂; $\Lambda = 25^\circ$; $i_{t,R} = 0.47^\circ$; $i_{t,L} = 0.57^\circ$.

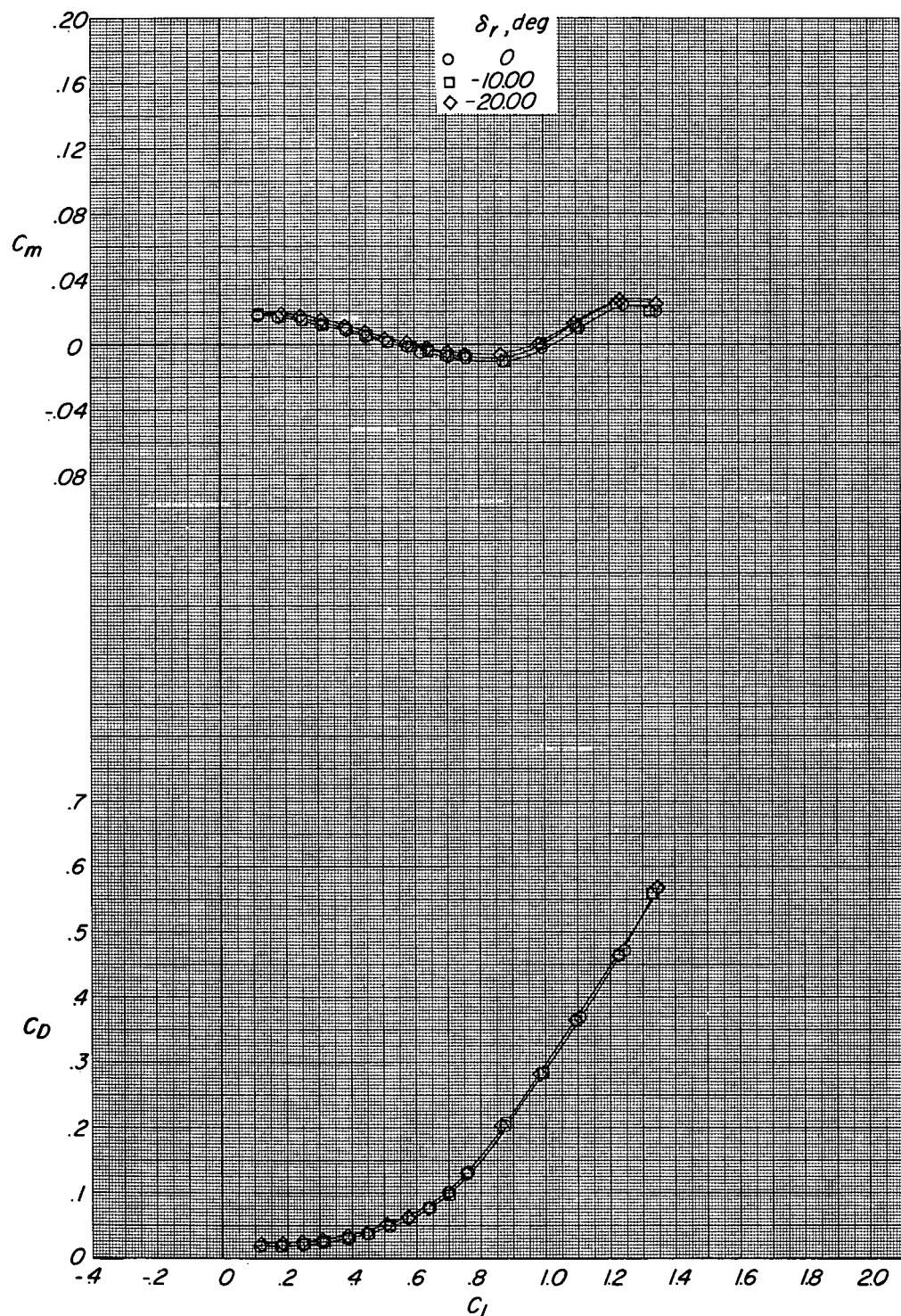


Figure 25.- Concluded.

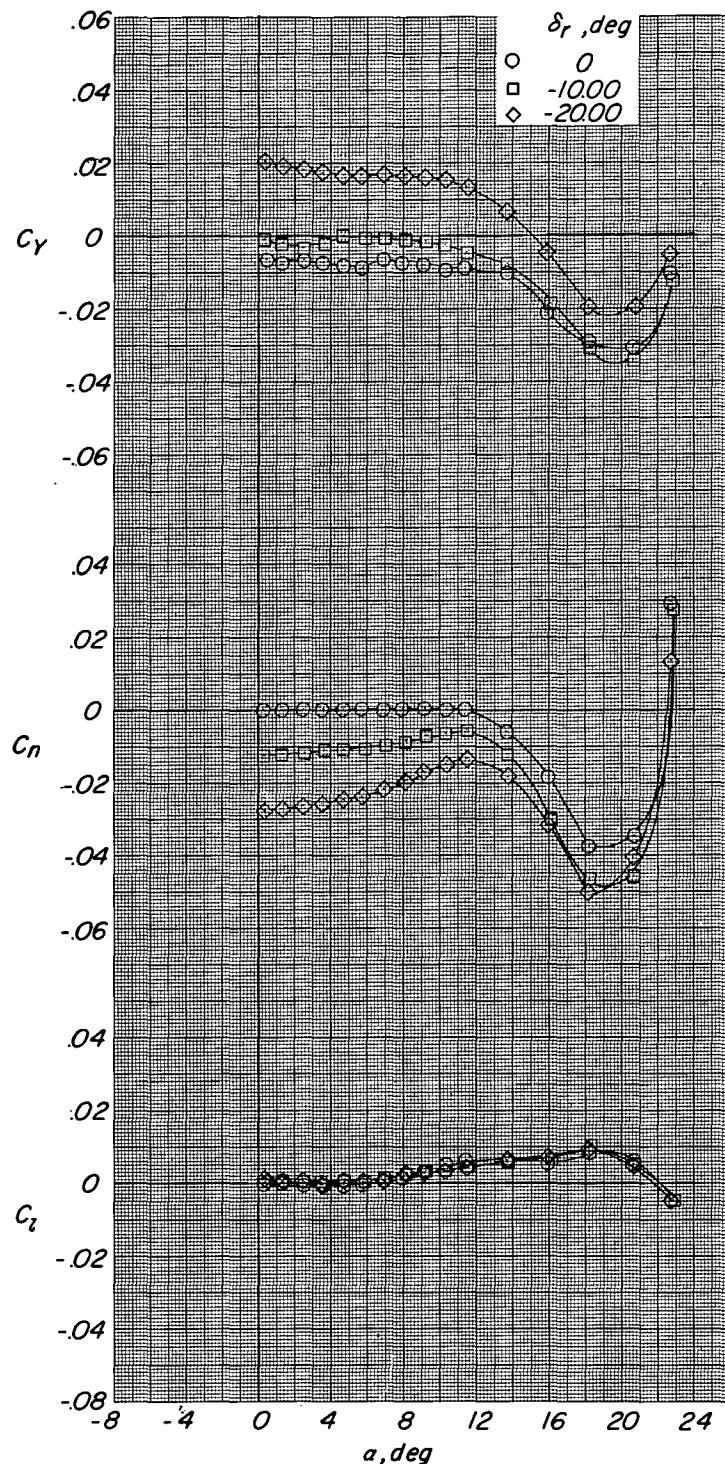


Figure 26.- Effect of rudder deflection on the lateral aerodynamic characteristics.
WBNH₁V₂; $\Lambda = 25^\circ$; $i_{t,R} = 0.47^\circ$; $i_{t,L} = 0.57^\circ$.

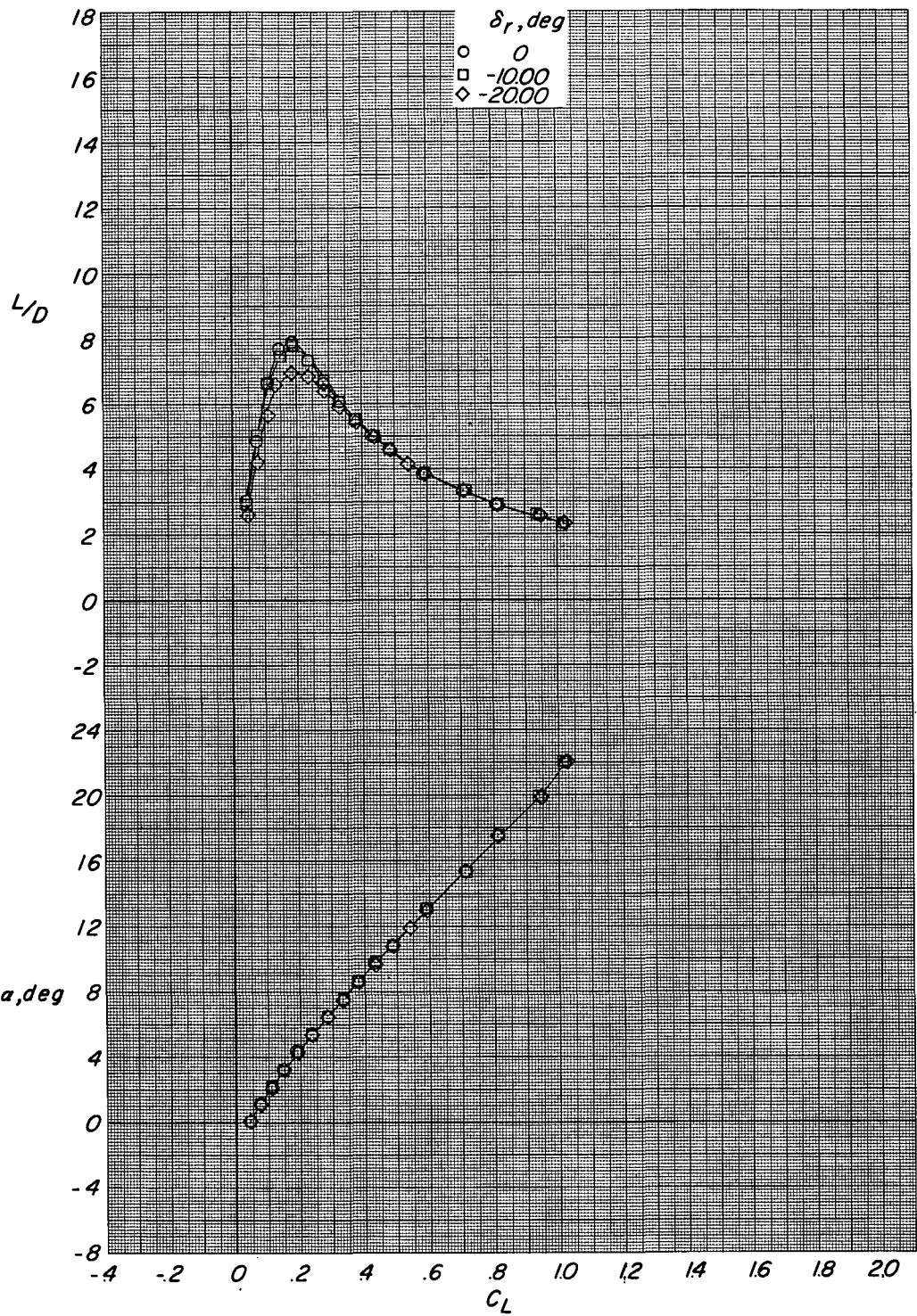


Figure 27.- Effect of rudder deflection angle on the longitudinal aerodynamic characteristics.
WENH₁V2; $i_{t,R} = 0.47^\circ$; $i_{t,L} = 0.57^\circ$; $\Lambda = 75^\circ$.

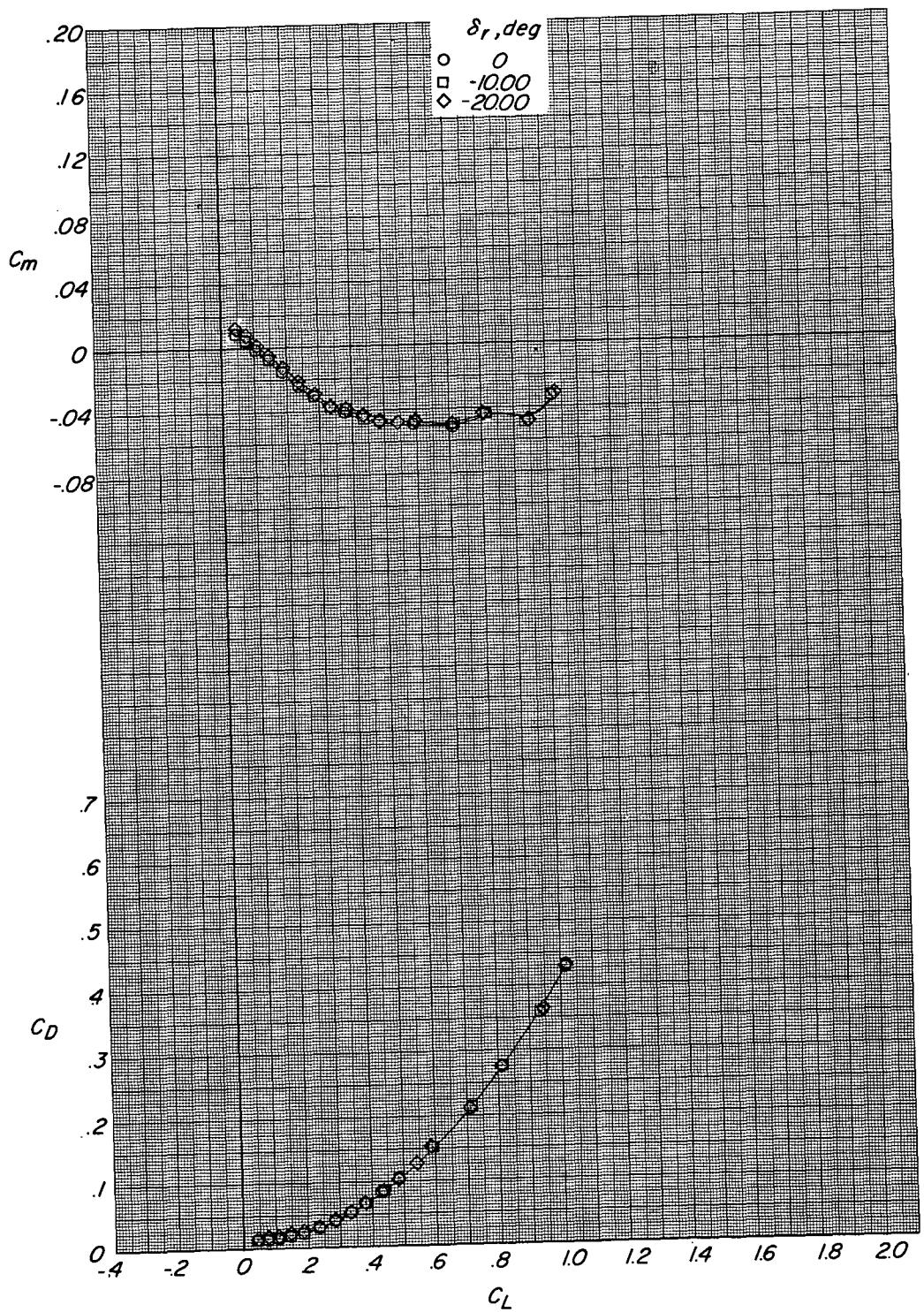


Figure 27.- Concluded.

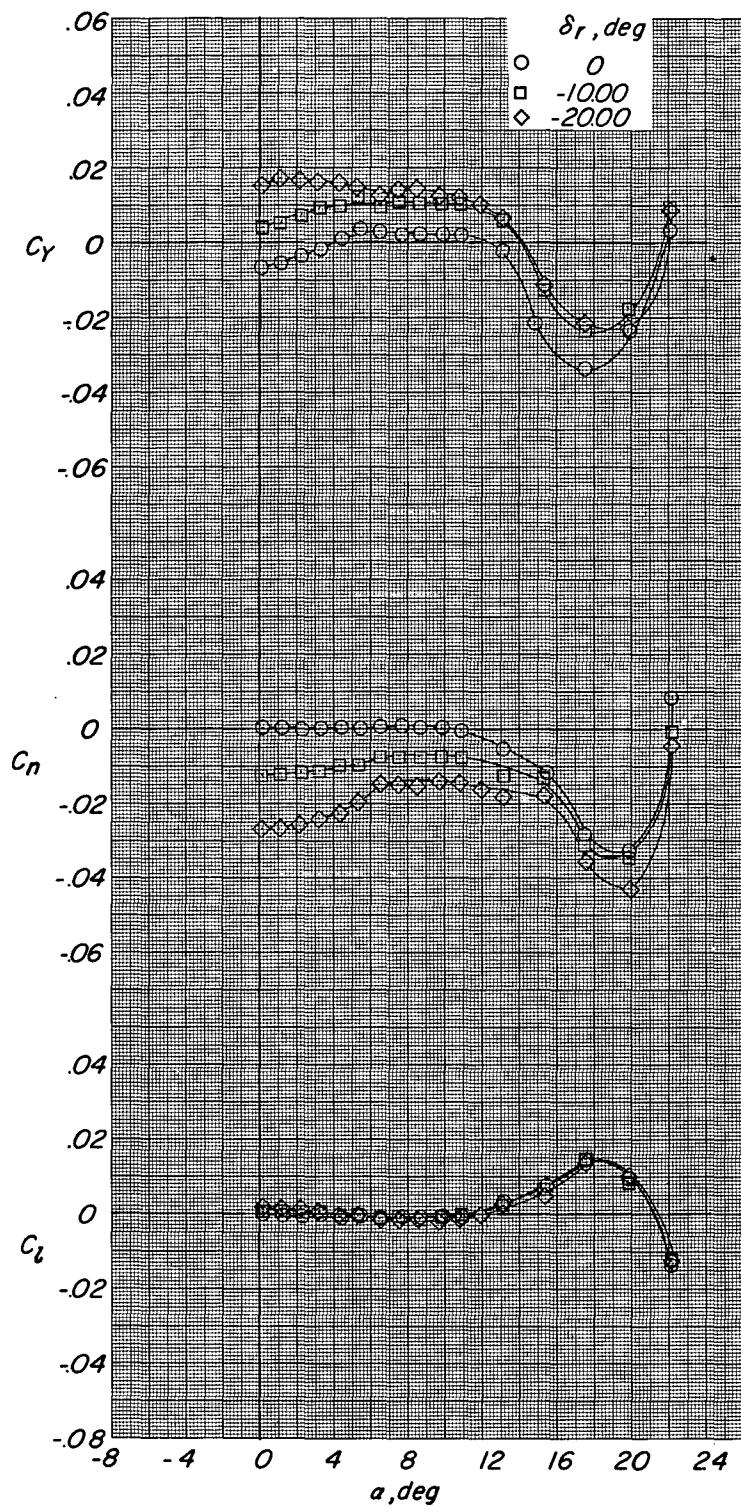


Figure 28.- Effect of rudder deflection on the lateral aerodynamic characteristics.
WBNH₁V₂; $\Lambda = 75^\circ$; $i_{t,R} = 0.47^\circ$; $i_{t,L} = 0.57^\circ$.

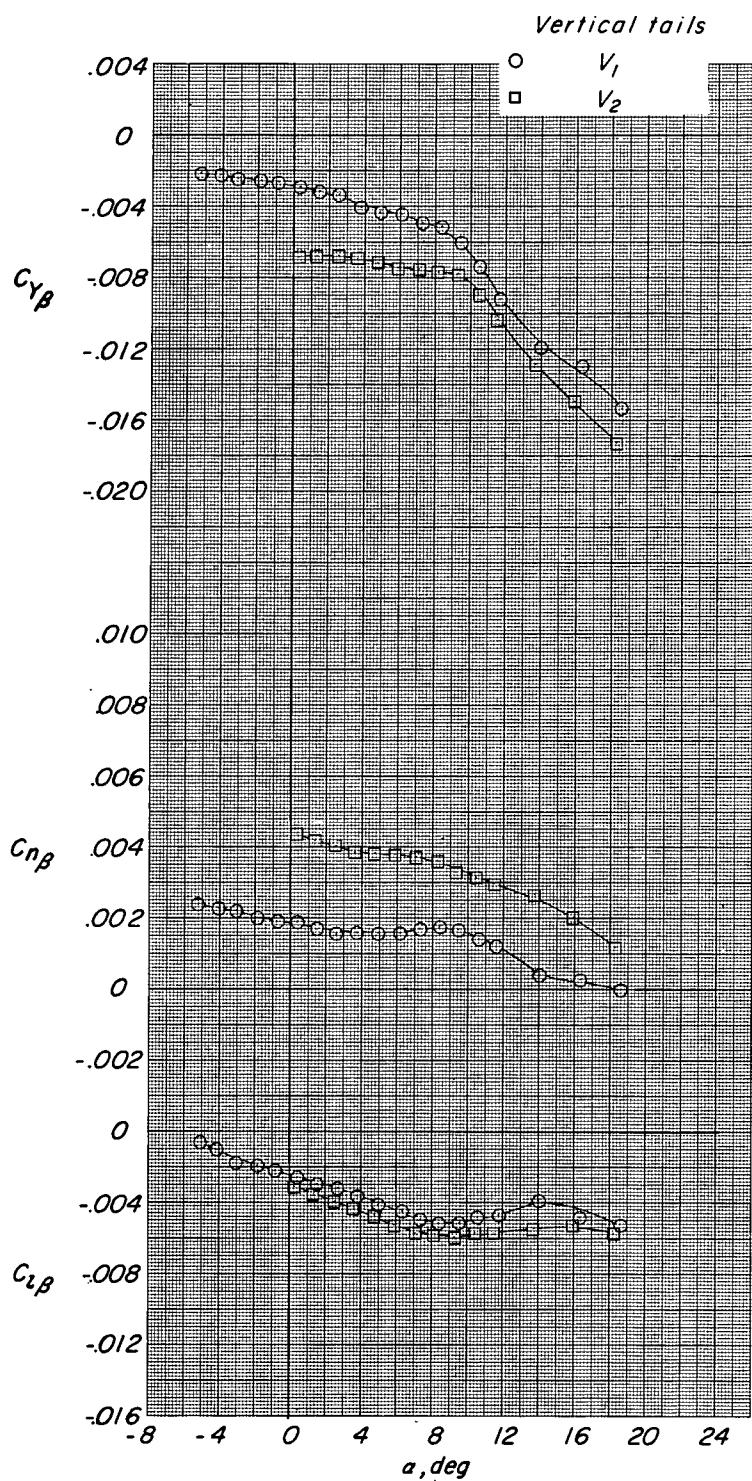


Figure 29.- Effect of vertical-tail size on the lateral stability derivatives. WBNH₁; $\Lambda = 25^\circ$.

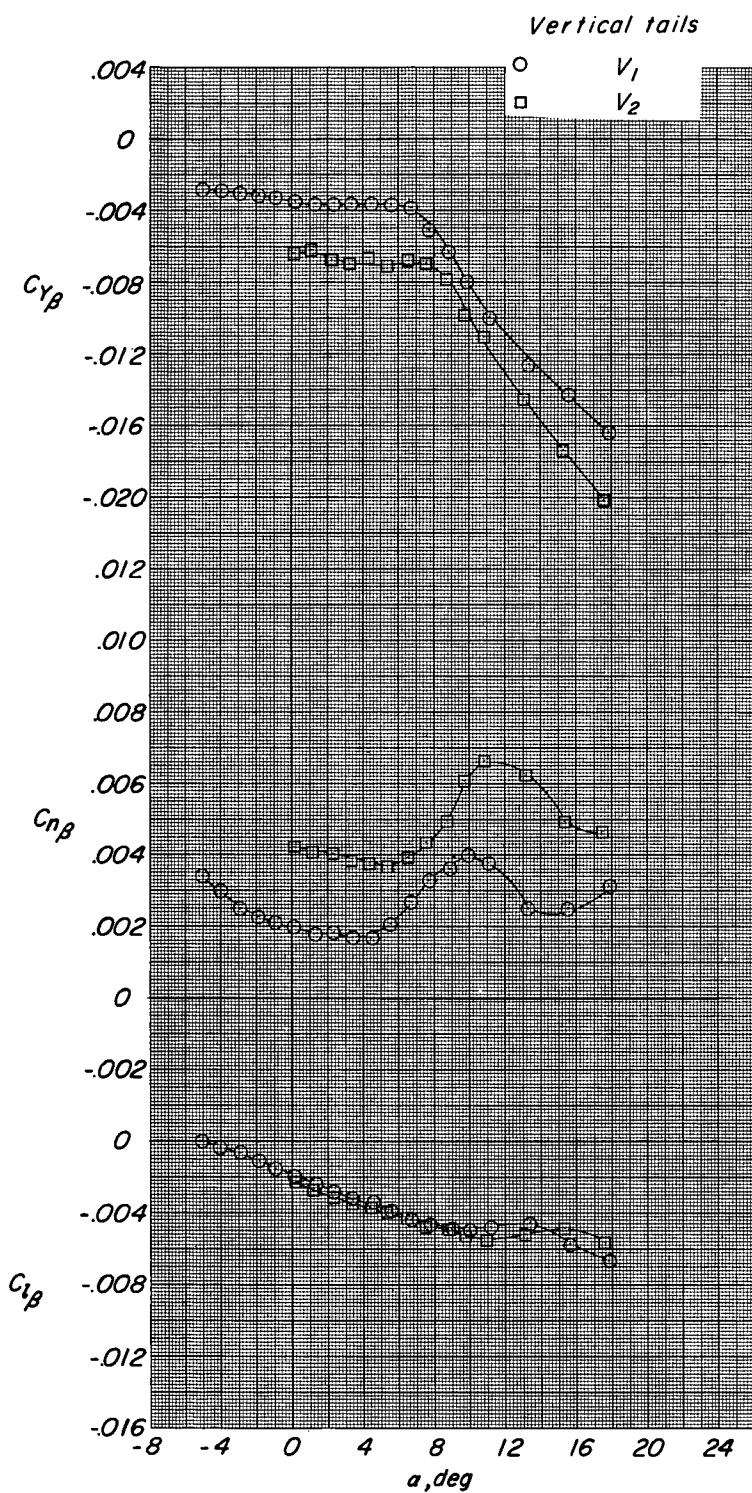


Figure 30.- Effect of vertical-tail size on the lateral aerodynamic characteristics. WBNH₁; $\Lambda = 75^\circ$.

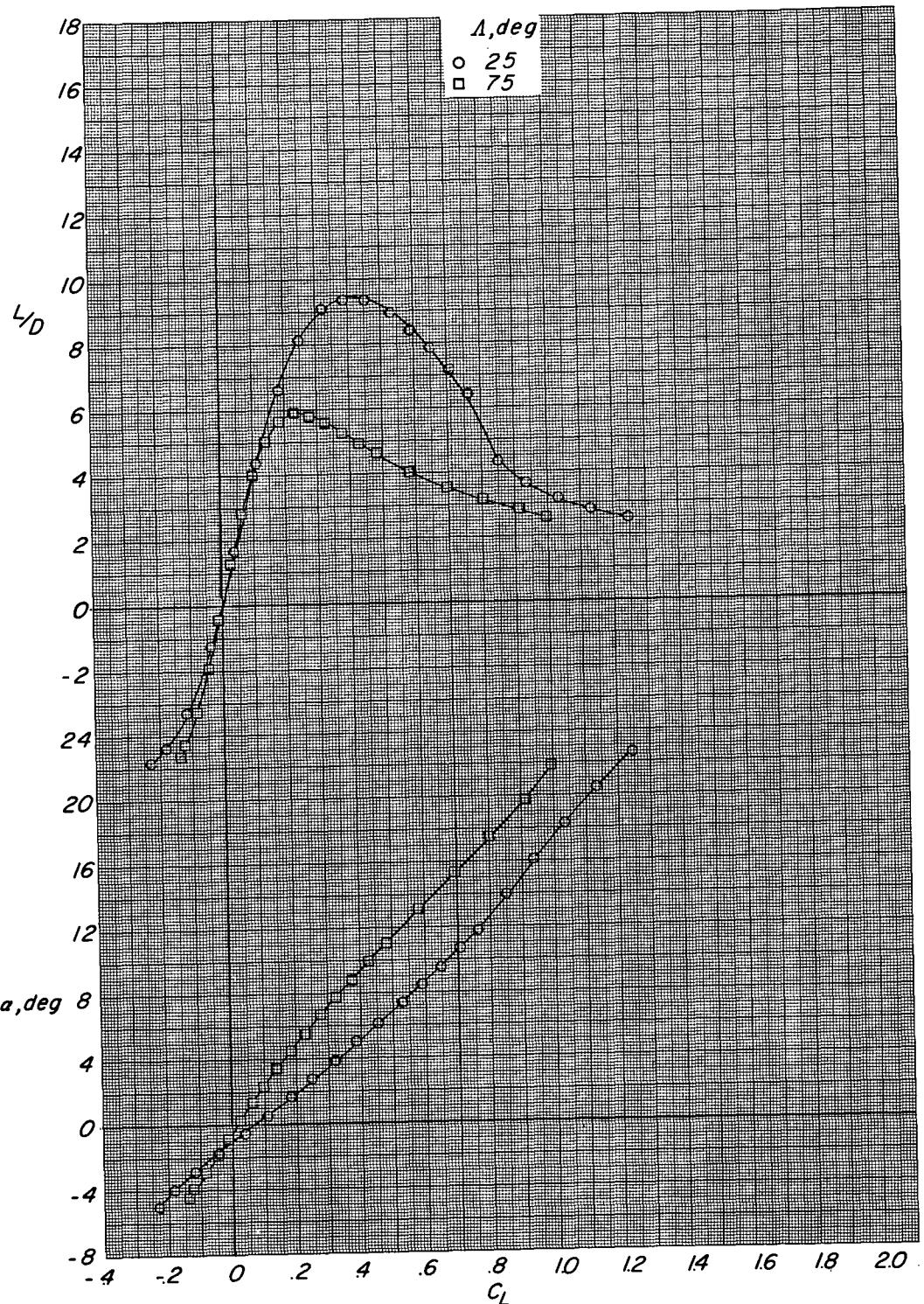


Figure 31.- Effect of wing leading-edge sweep angle on the longitudinal aerodynamic characteristics for configuration with the forewing drooped. WBNH₂V₁; $i_t = 0^\circ$.

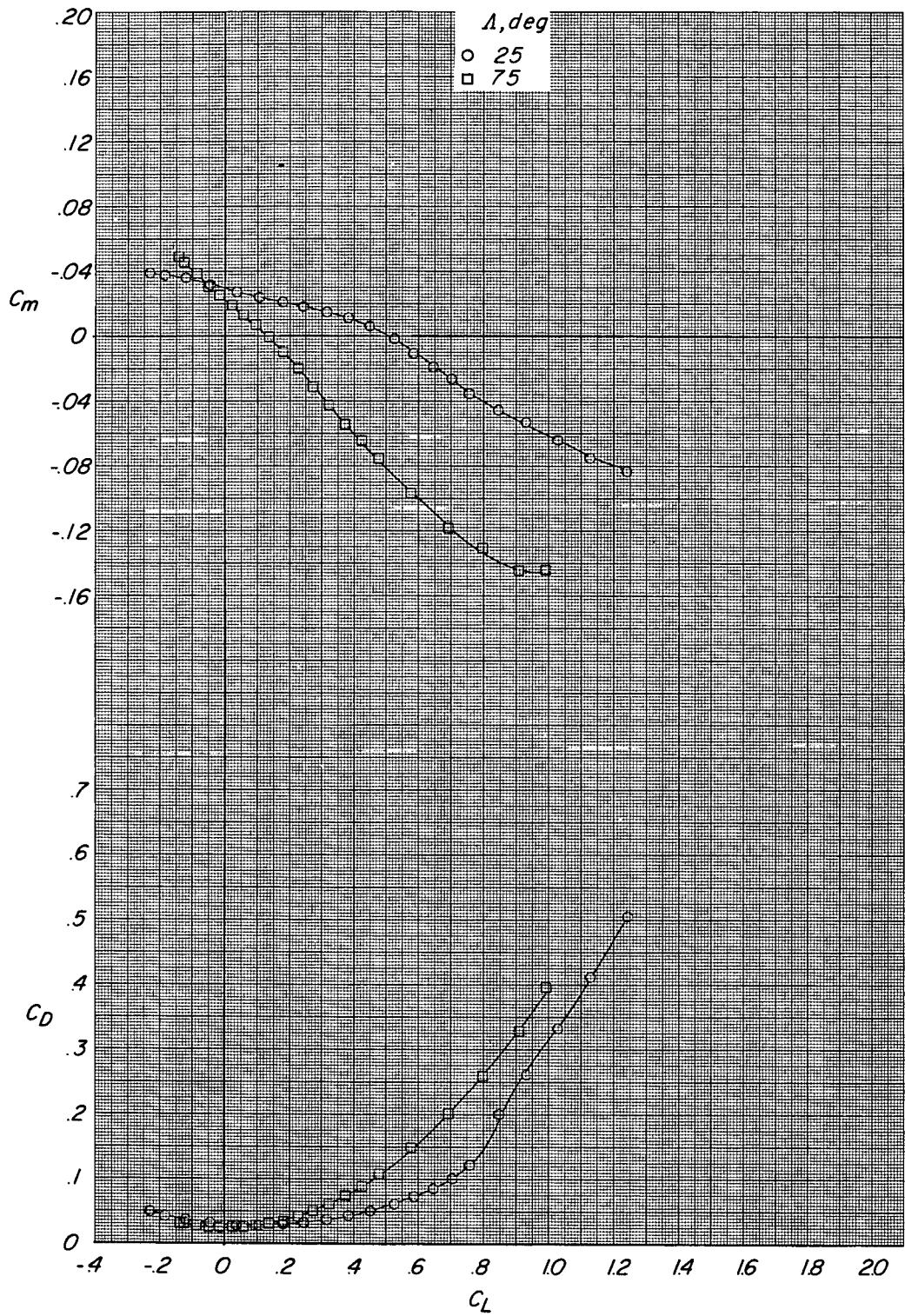


Figure 31.- Concluded.

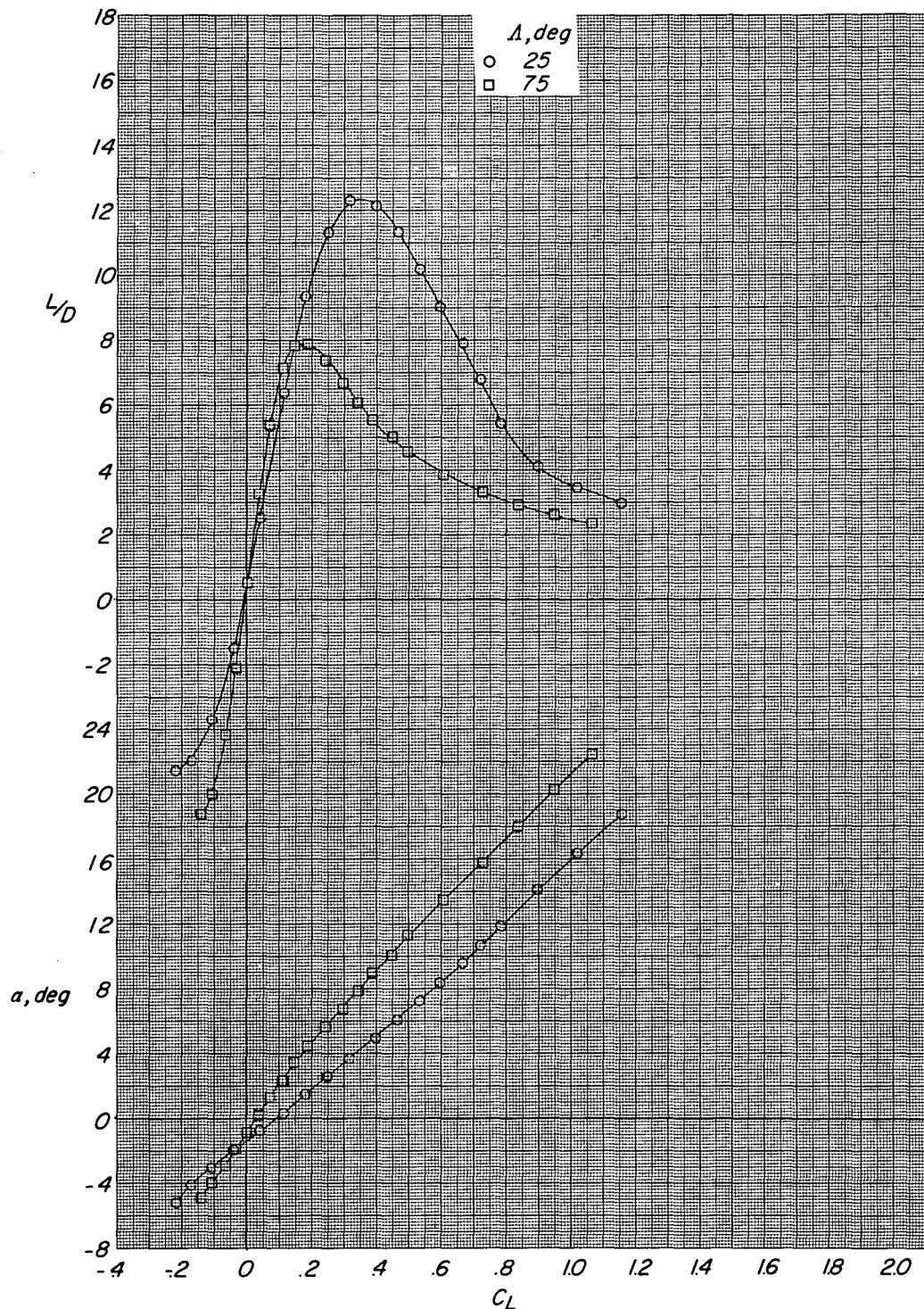


Figure 32.- Effect of wing leading-edge sweep angle on the longitudinal aerodynamic characteristics for configuration with the canard. WBNH₁V₁CA; $i_{\text{t},R} = 0.50^\circ$; $i_{\text{t},L} = 0.18^\circ$; $\delta_c = -0.47^\circ$.

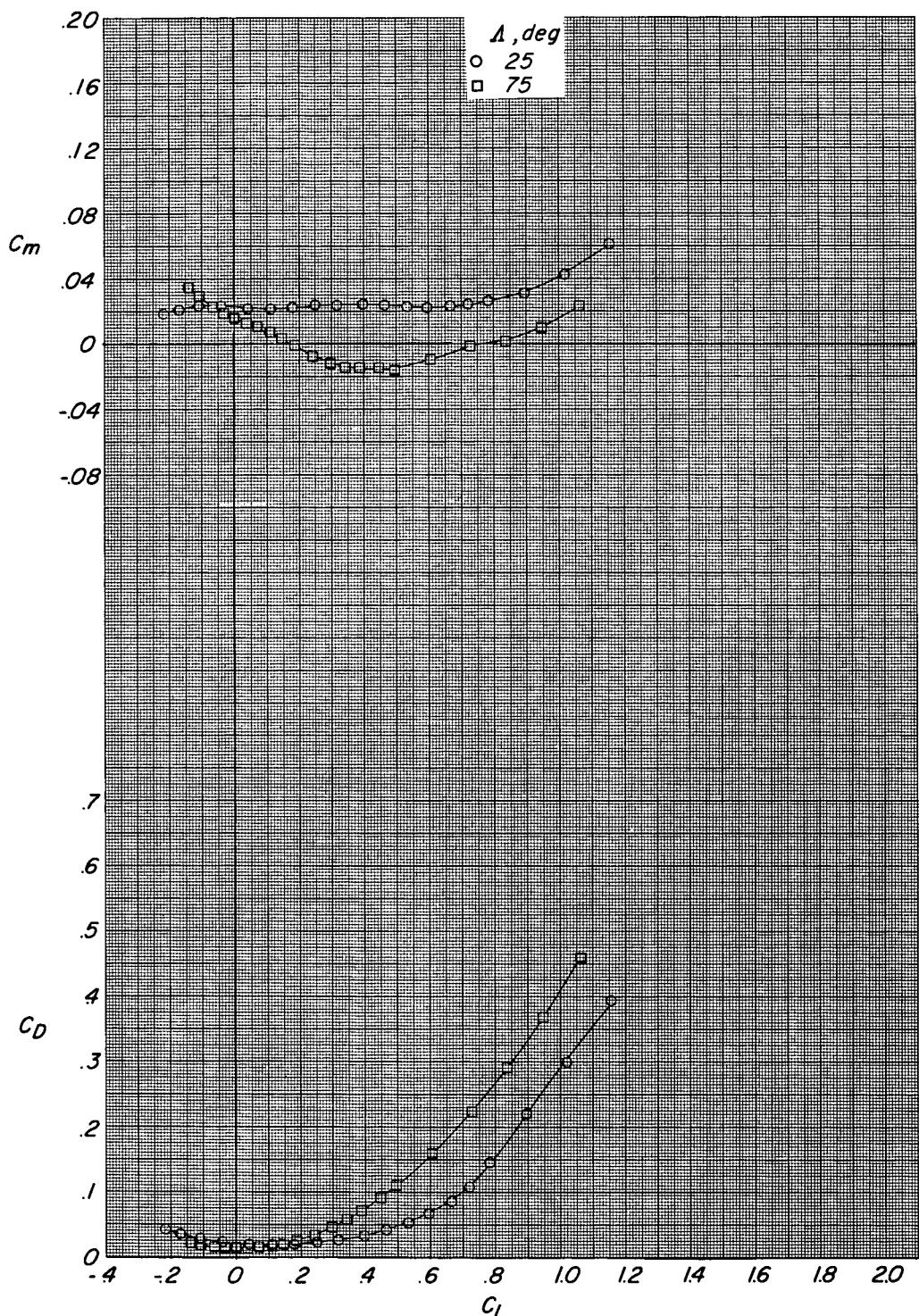


Figure 32.- Concluded.

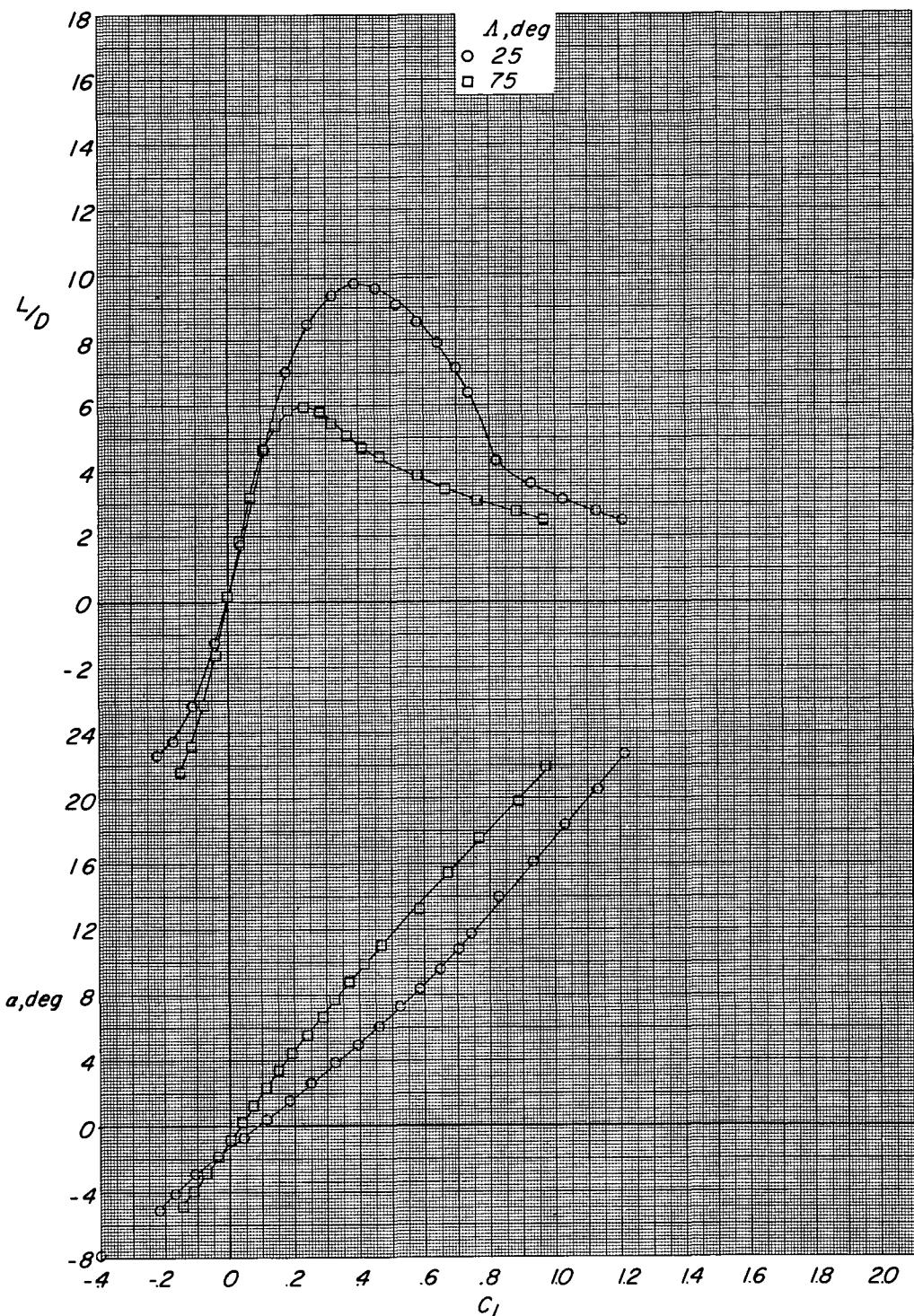


Figure 33.- Effect of wing leading-edge sweep angle on the longitudinal aerodynamic characteristics for configuration with the forewing drooped. WBNH1V1; $i_{t,R} = 0.05^\circ$; $i_{t,L} = 0.18^\circ$; $\delta_n = -42^\circ$.

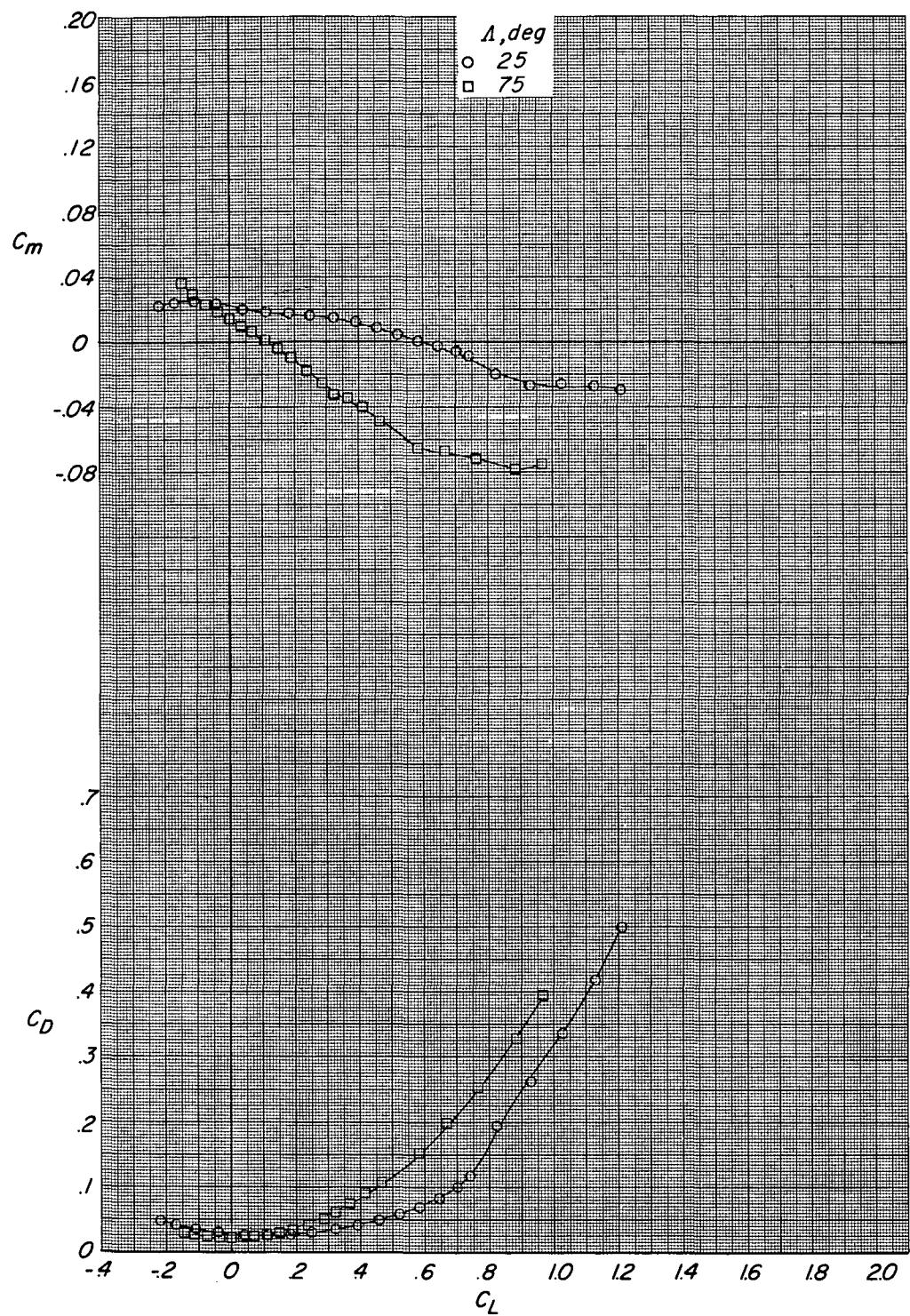


Figure 33.- Concluded.

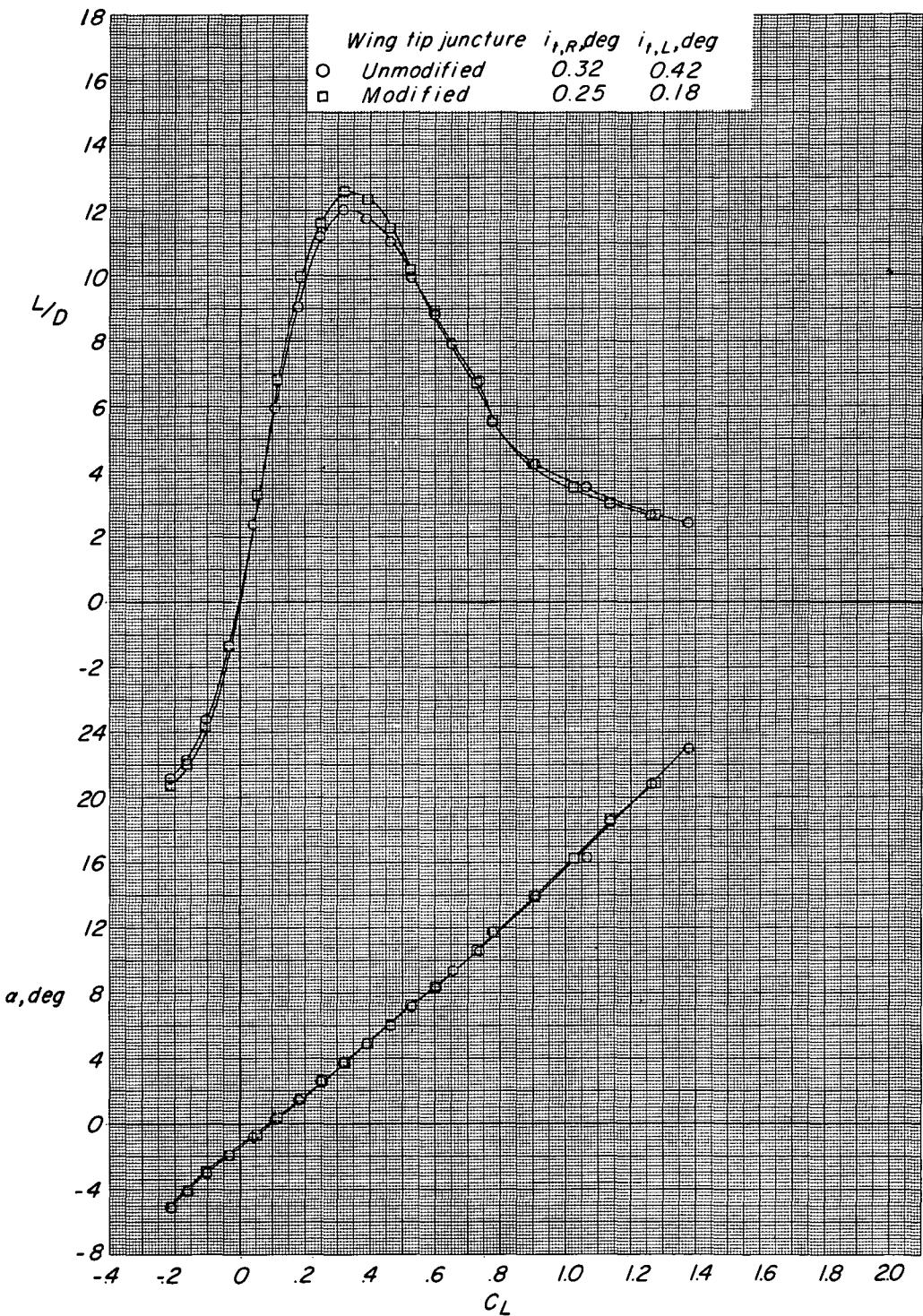


Figure 34.- Effect of modification of the wing-tip juncture on the longitudinal aerodynamic characteristics. WBNH₁V₁; $\Lambda = 25^\circ$.

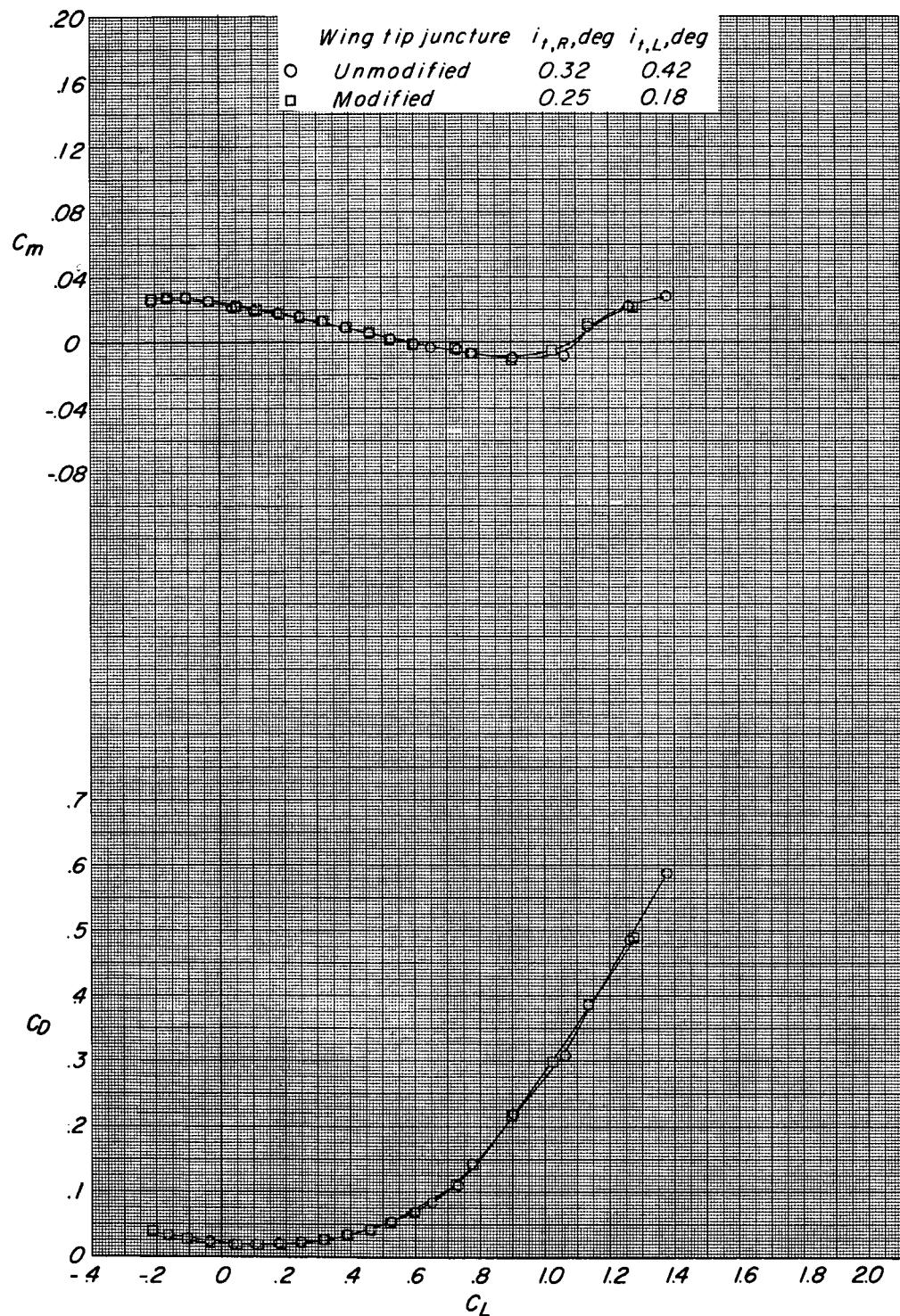


Figure 34.- Concluded.

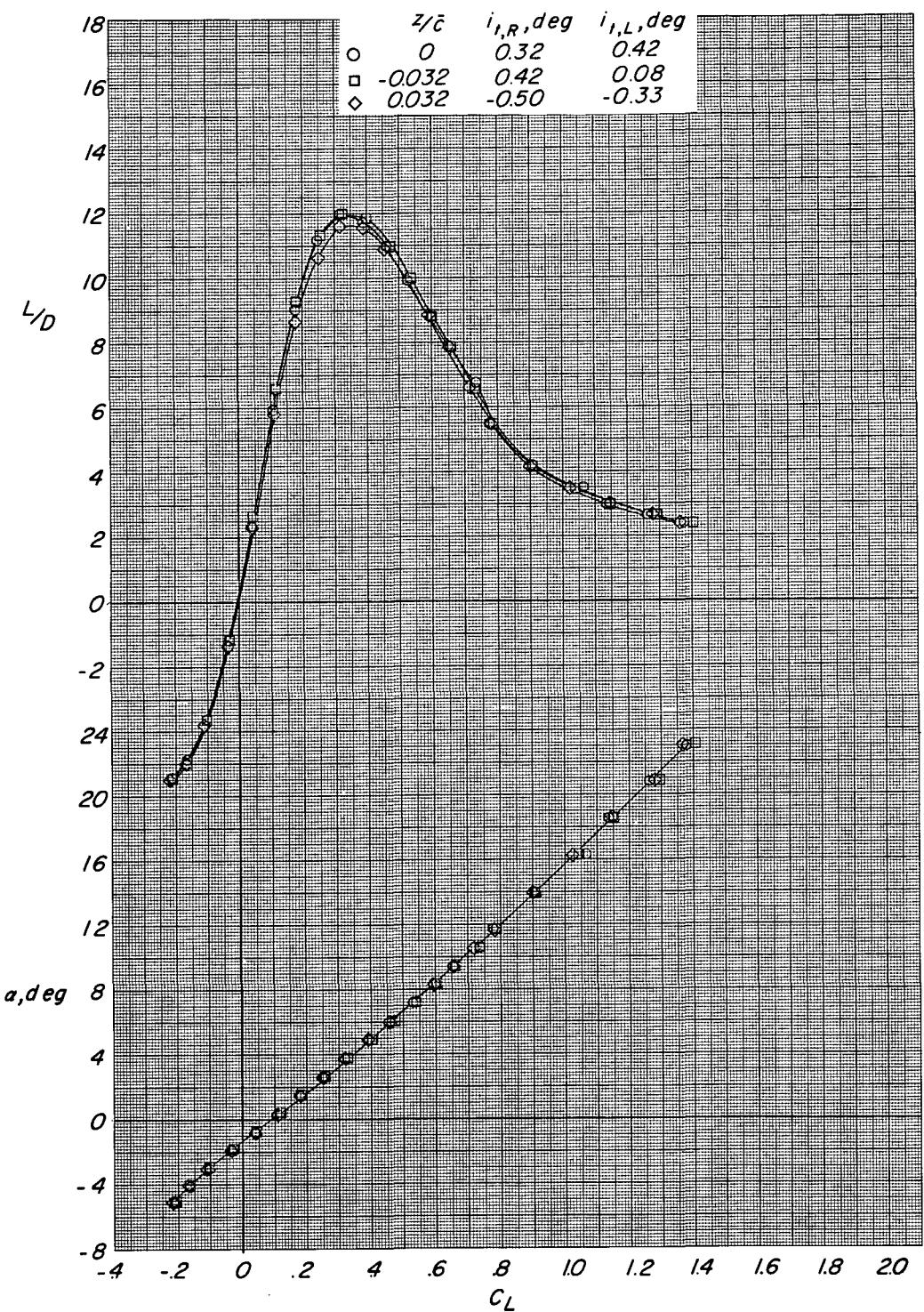


Figure 35.- Effect of vertical position of the horizontal tail on the longitudinal aerodynamic characteristics with auxiliary wing panels swept 25°. WBNH₁V1.

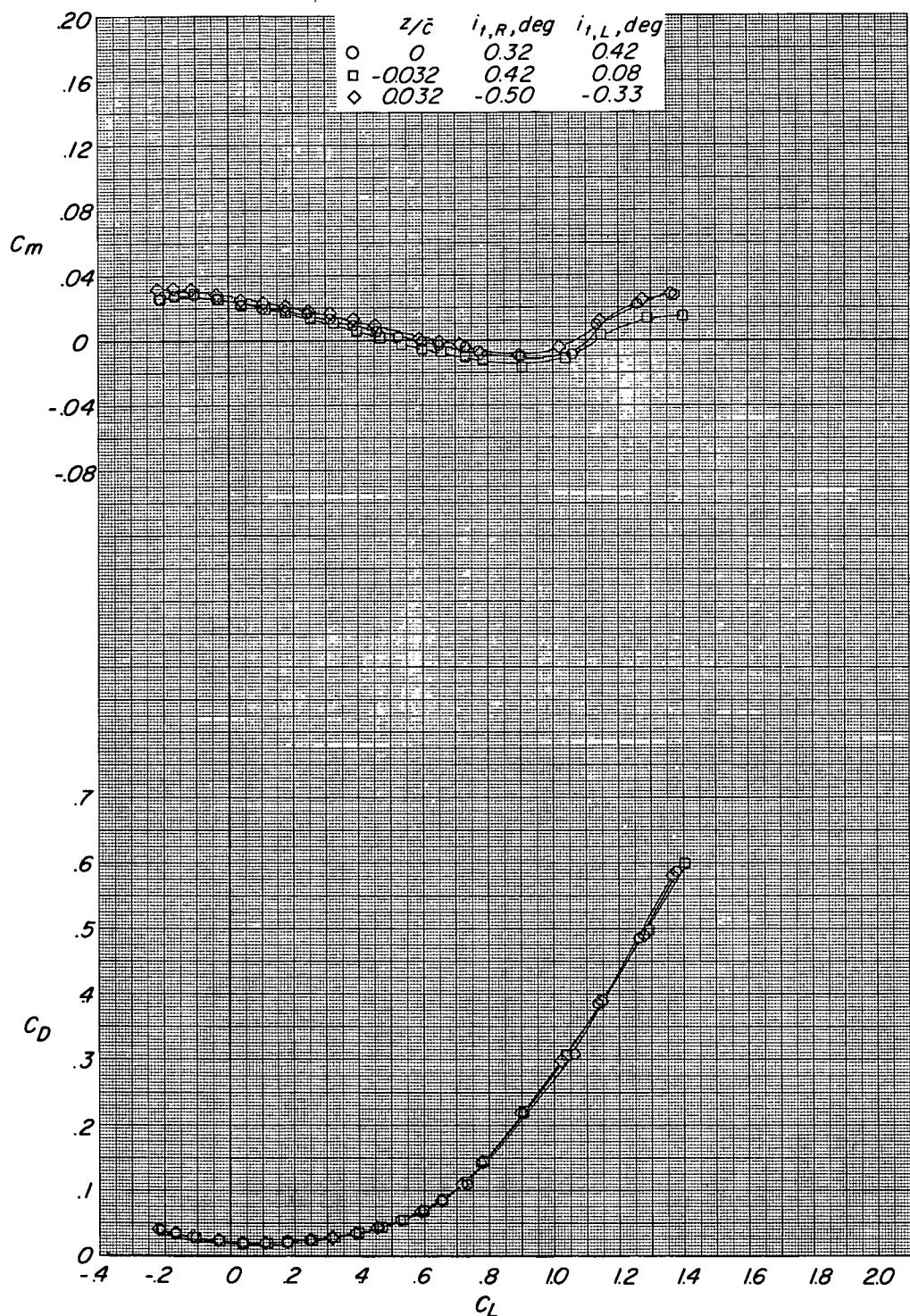


Figure 35.. Concluded.

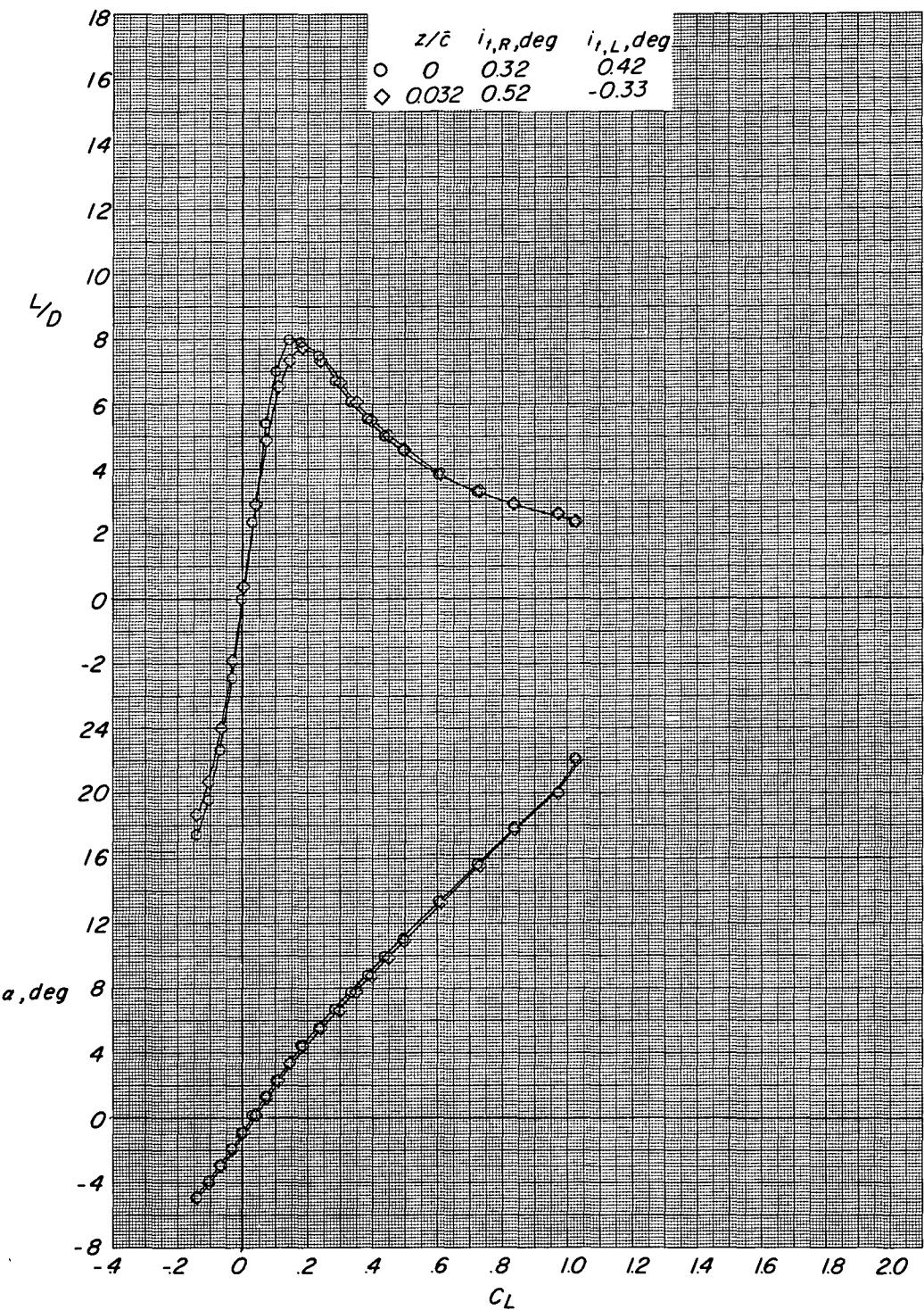


Figure 36.- Effect of vertical position of the horizontal tail on the longitudinal aerodynamic characteristics with auxiliary wing panels swept 75° . WBNH₁V₁.

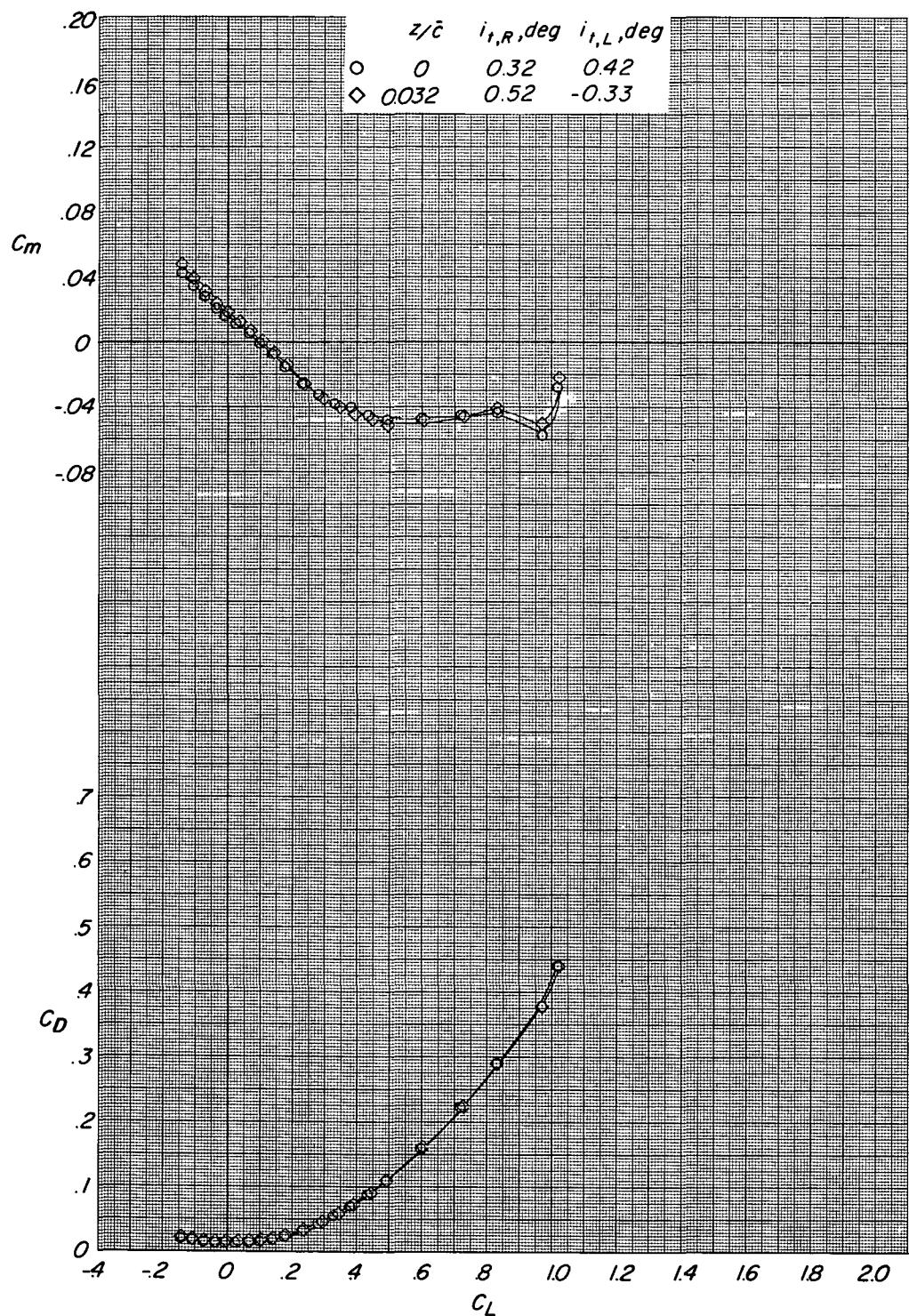


Figure 36.- Concluded.

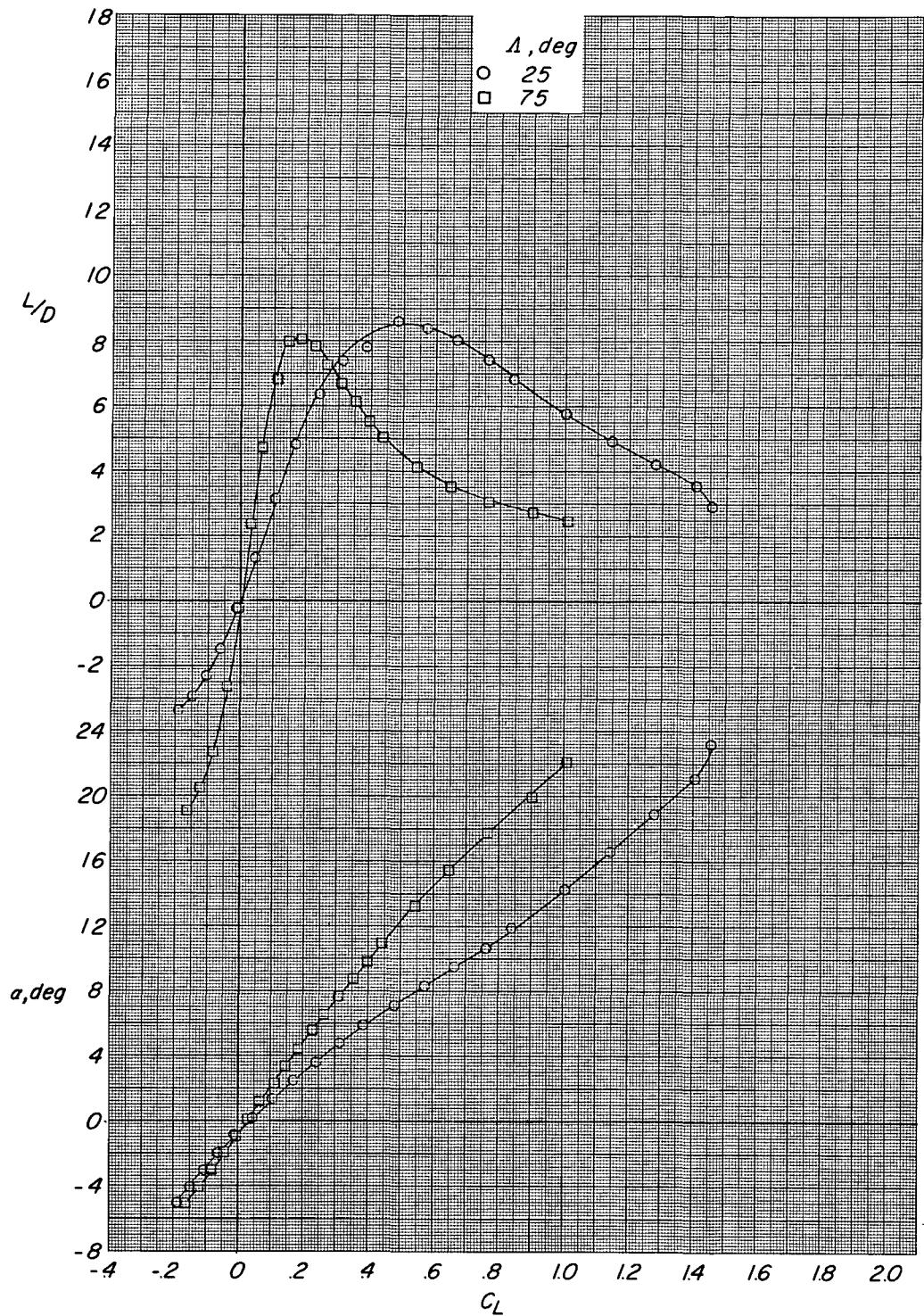


Figure 37.- Effect of wing leading-edge sweep angle on the longitudinal aerodynamic characteristics for the configuration with the slat on. WBNH₁V1; $i_{t,R} = 0.35^\circ$; $i_{t,L} = 0.17^\circ$; $\delta_f = 0^\circ$.

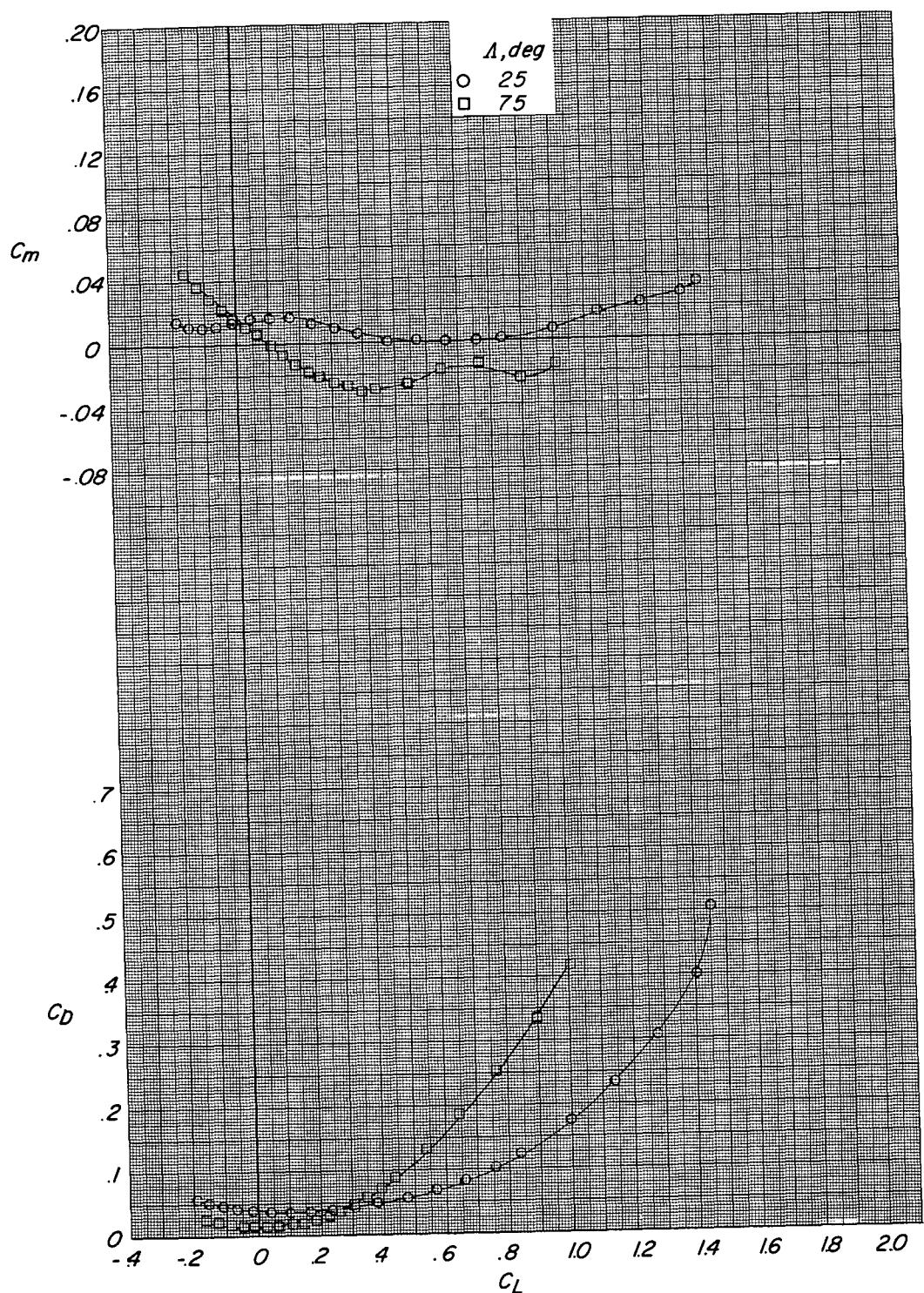


Figure 37.- Concluded.

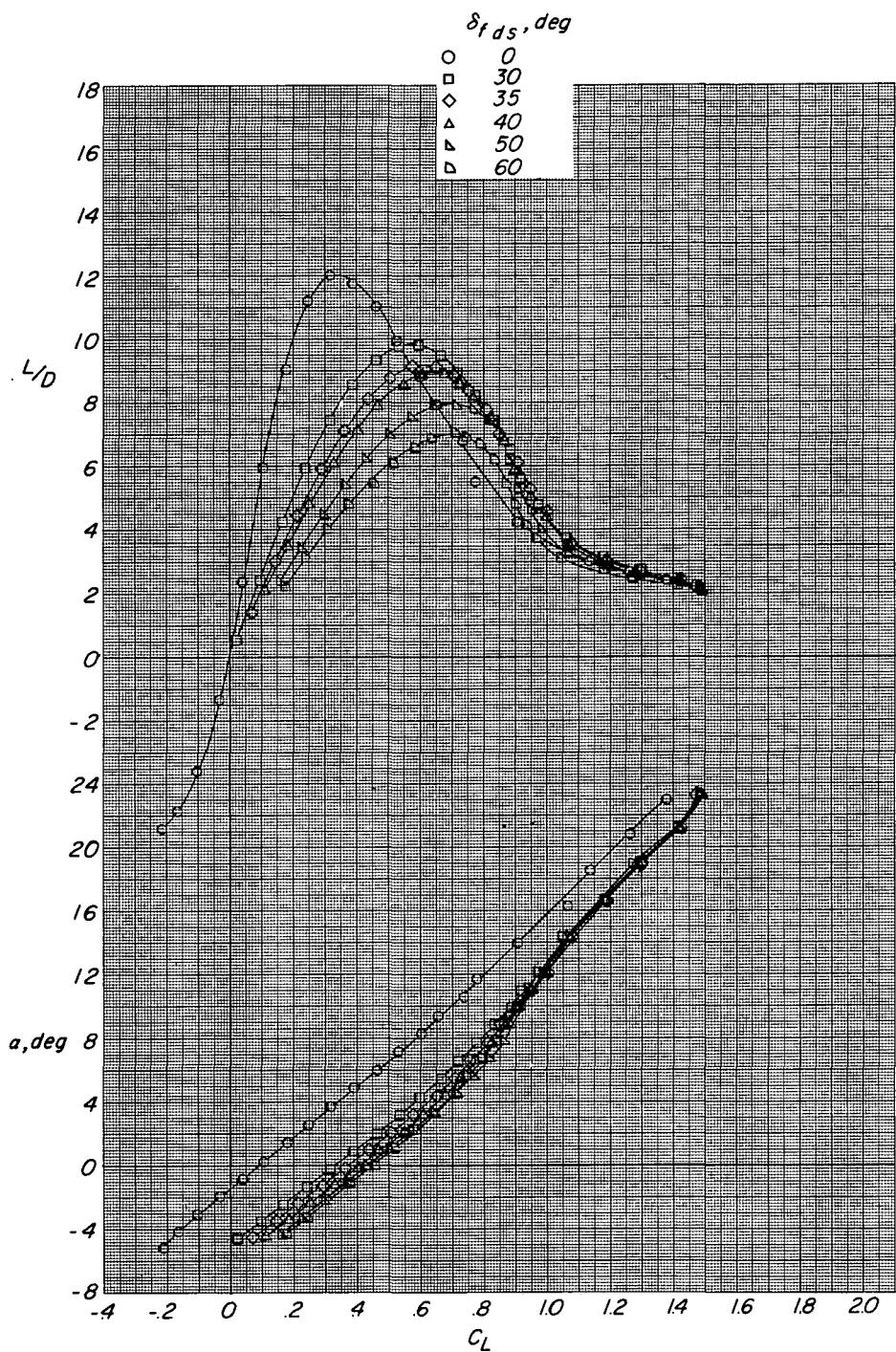


Figure 38.- Effect of deflections of the double slotted flap on the longitudinal aerodynamic characteristics for the configuration with the slat off. WBNH₁V1; $\Lambda = 25^\circ$; $i_{t,R} = 0.67^\circ$; $i_{t,L} = 0.42^\circ$.

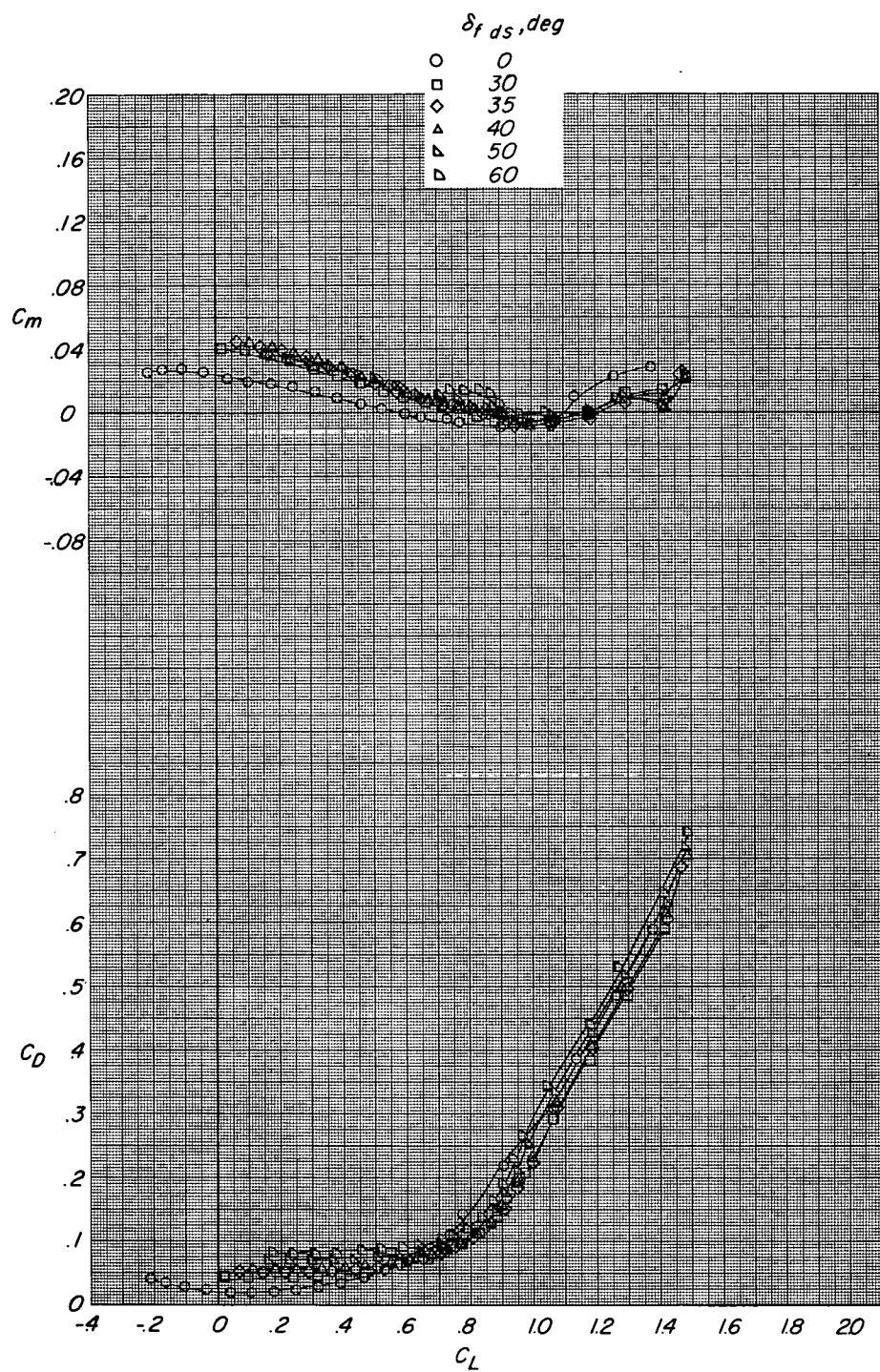


Figure 38.- Concluded.

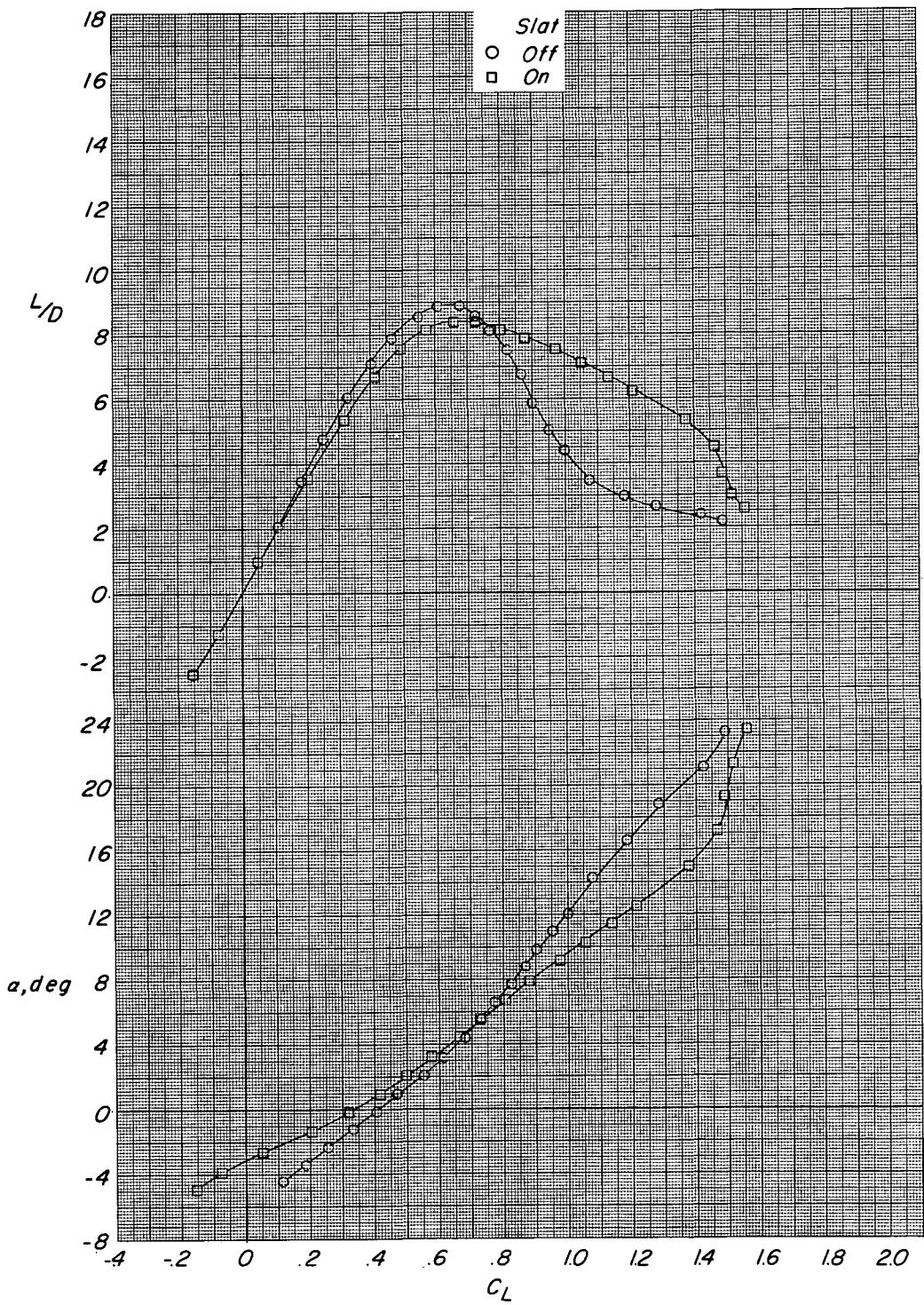


Figure 39.- Effect of slat on the longitudinal aerodynamic characteristics with trailing-edge double slotted flap deflected 40°. WBNH₁V₁; $\Lambda = 25^\circ$; $i_{t,R} = 0.67^\circ$; $i_{t,L} = 0.42^\circ$.

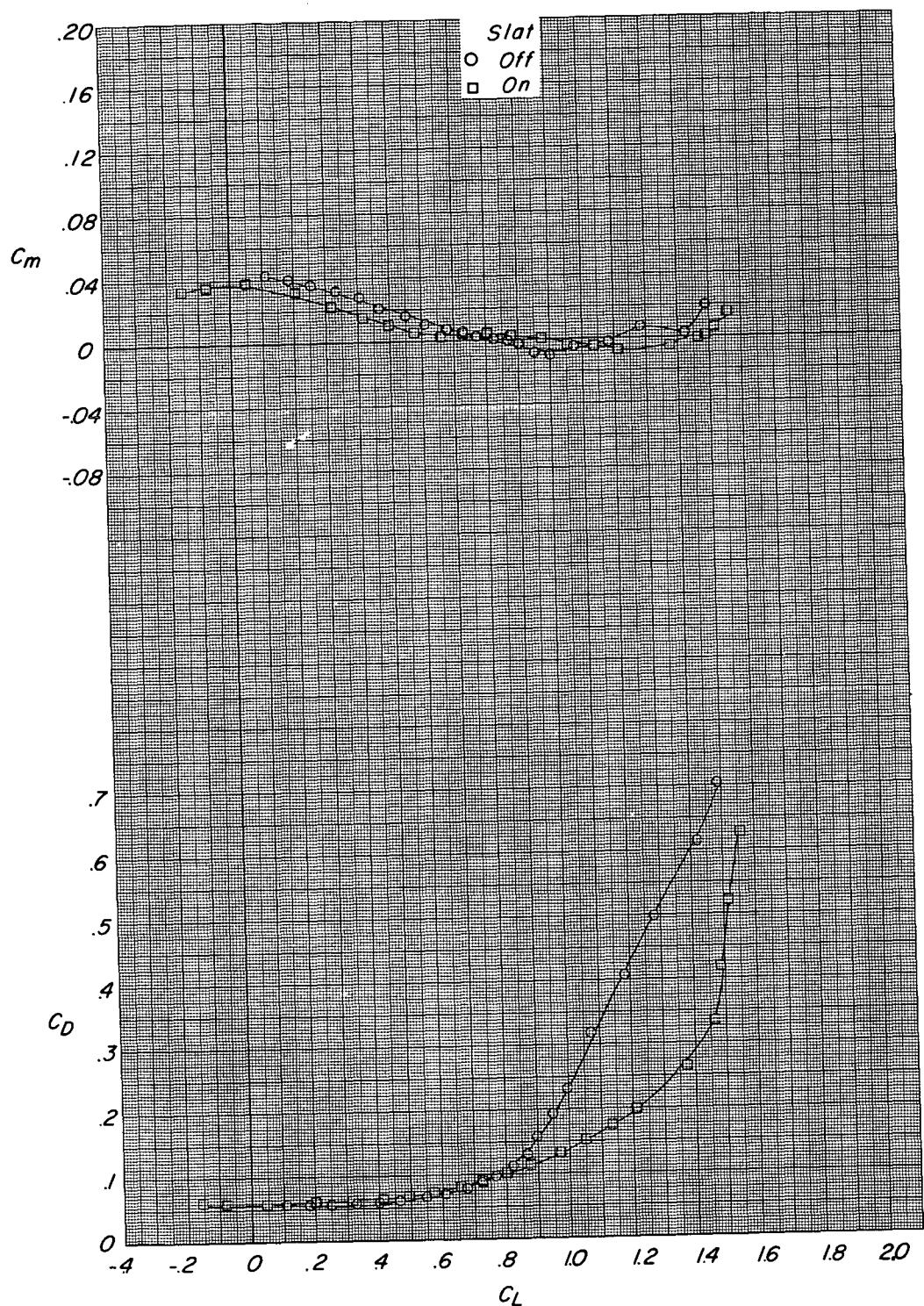


Figure 39.- Concluded.

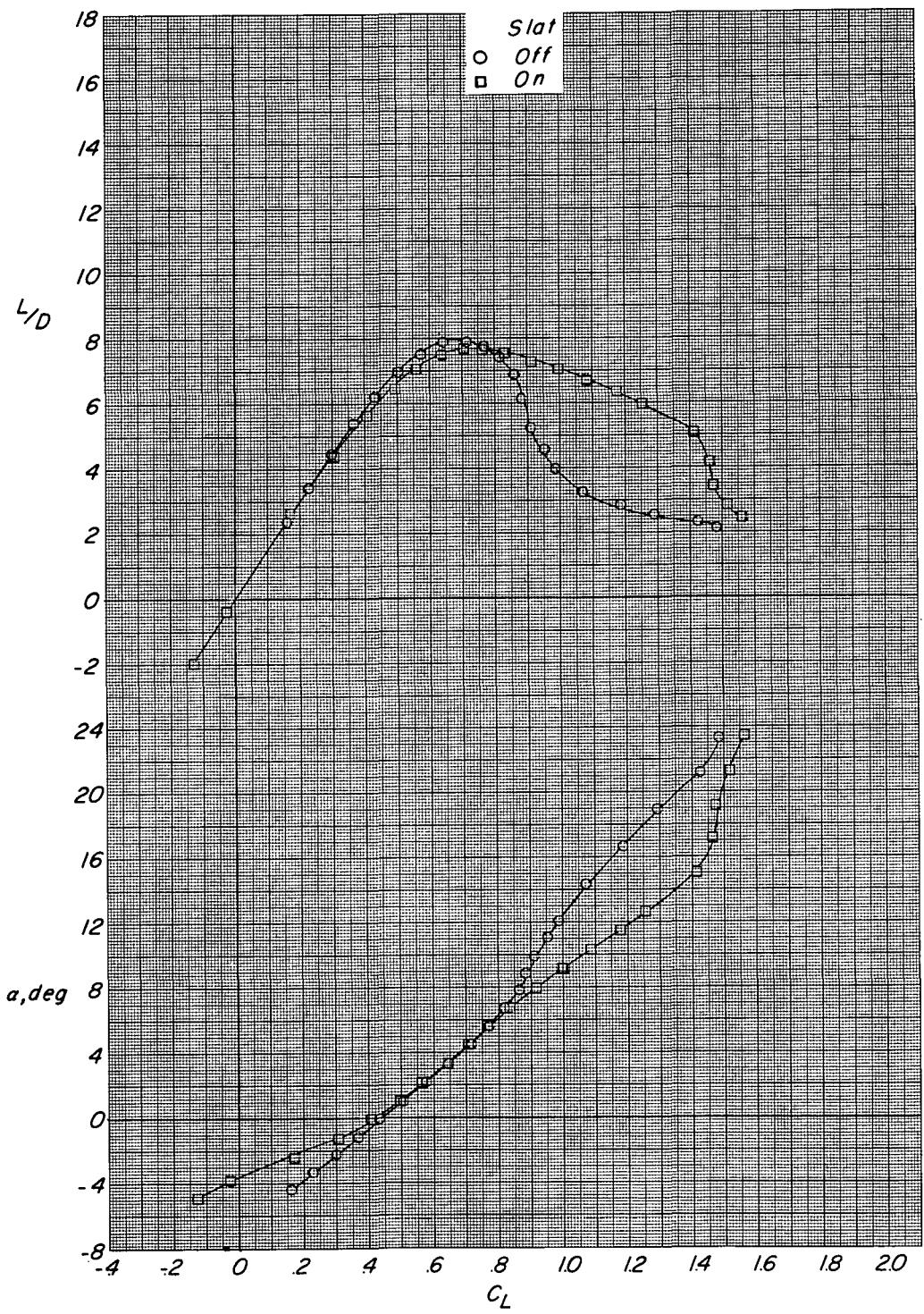


Figure 40.- Effect of slat on the longitudinal aerodynamic characteristics with trailing-edge double slotted flap deflected 50° . WBNH₁V₁; $\Lambda = 25^\circ$; $i_{t,R} = 0.35^\circ$; $i_{t,L} = 0.17^\circ$.

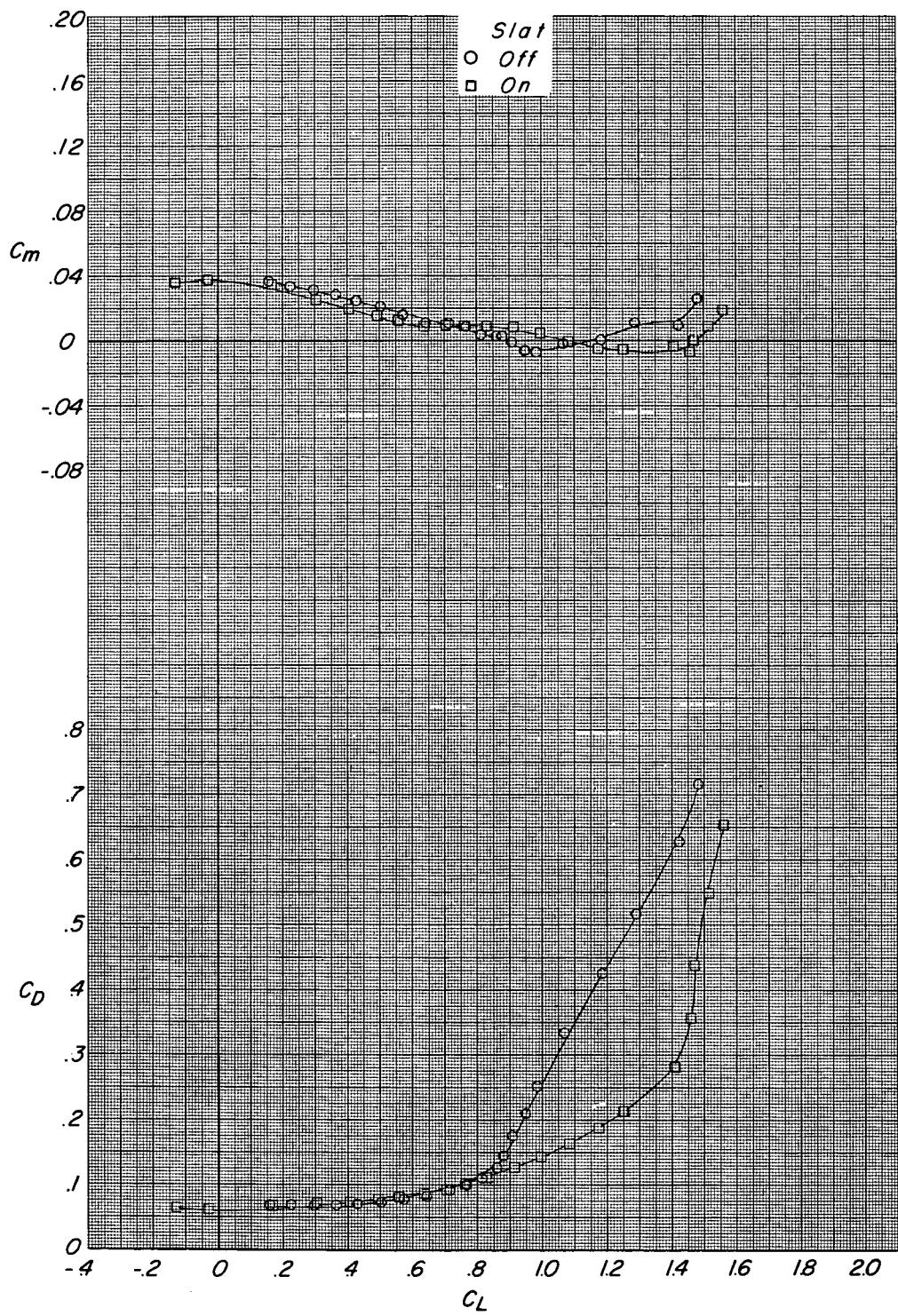


Figure 40.- Concluded.

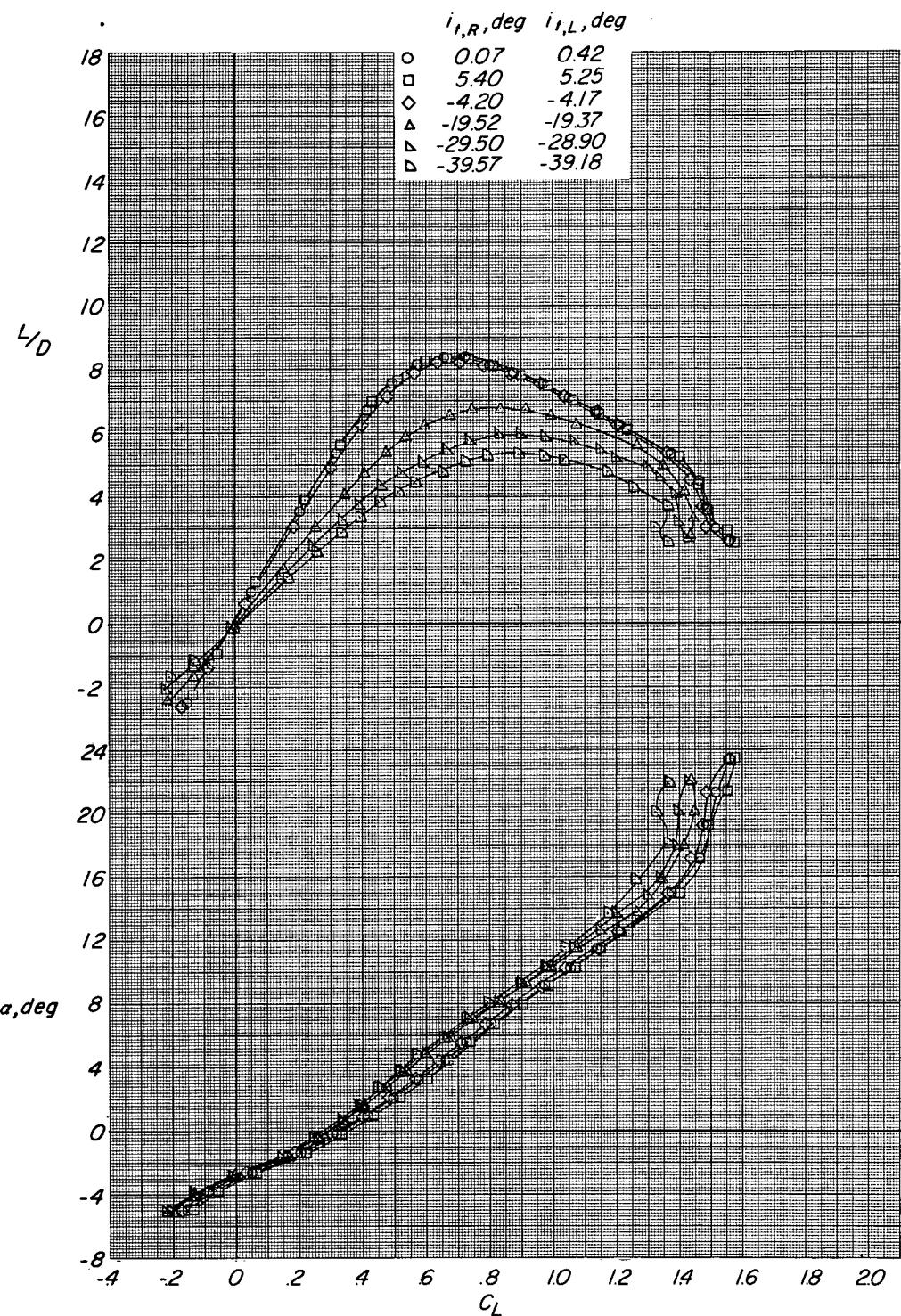


Figure 41.- Effect of horizontal-tail deflection angles on the longitudinal aerodynamic characteristics. Slat on. WBNH₁V₁; $\Lambda = 25^\circ$; $\delta_{f_{ds}} = 40^\circ$.

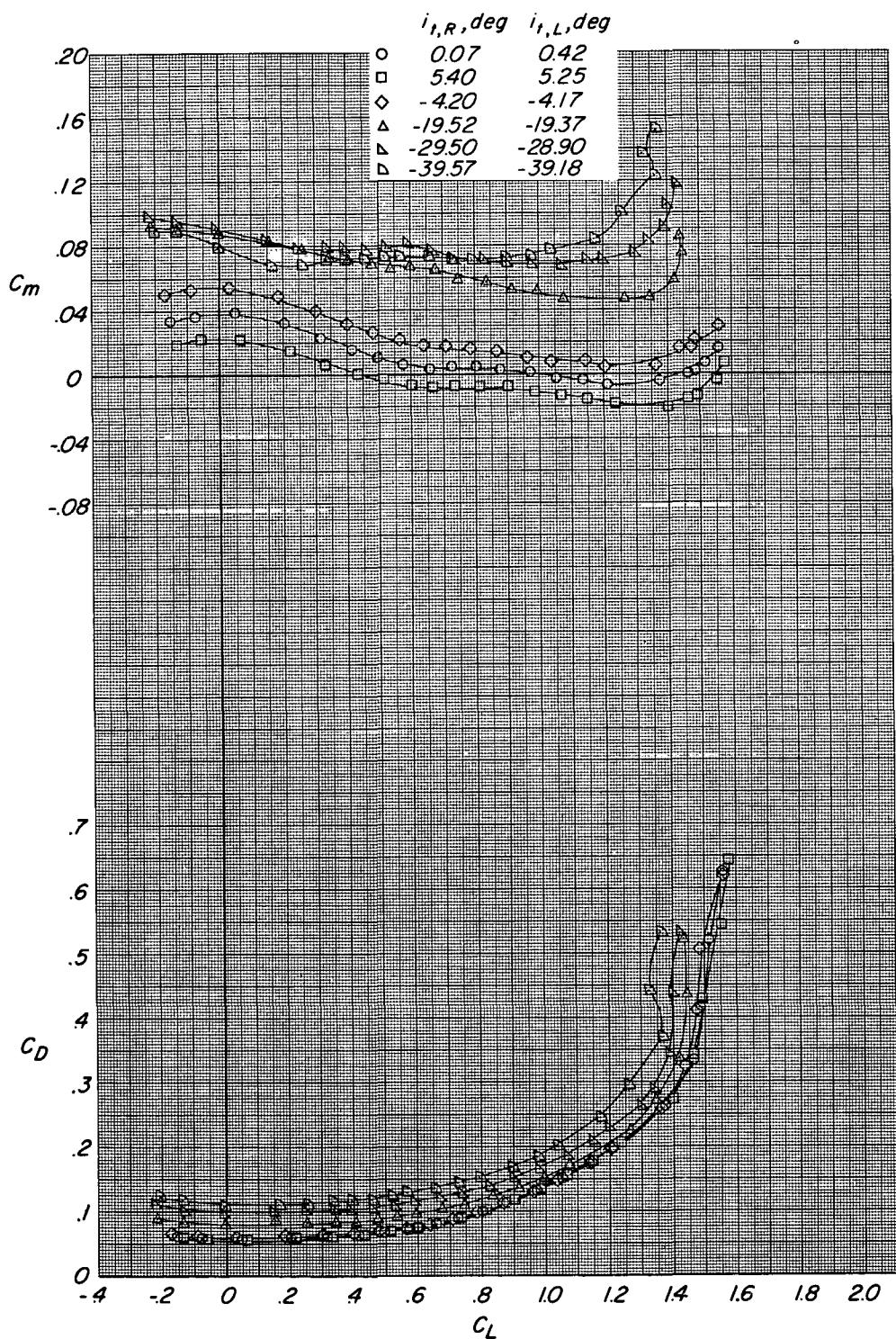


Figure 41.- Concluded.

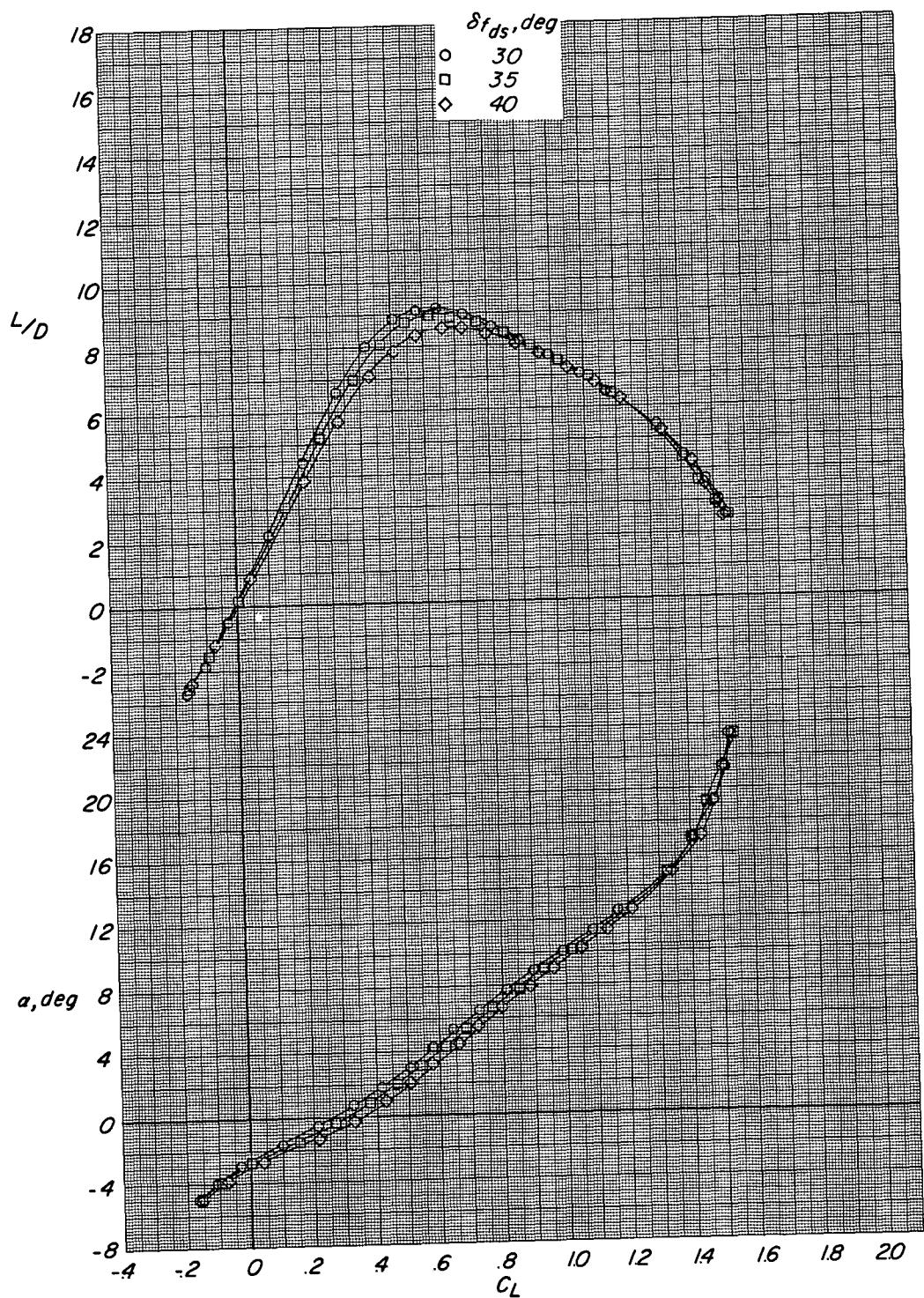


Figure 42.- Effect of deflections of the double slotted flap on the longitudinal aerodynamic characteristics. Slat on. WBNH₁V₁A; $\Lambda = 25^\circ$; $i_{t,R} = 0.53^\circ$; $i_{t,L} = 0.67^\circ$.

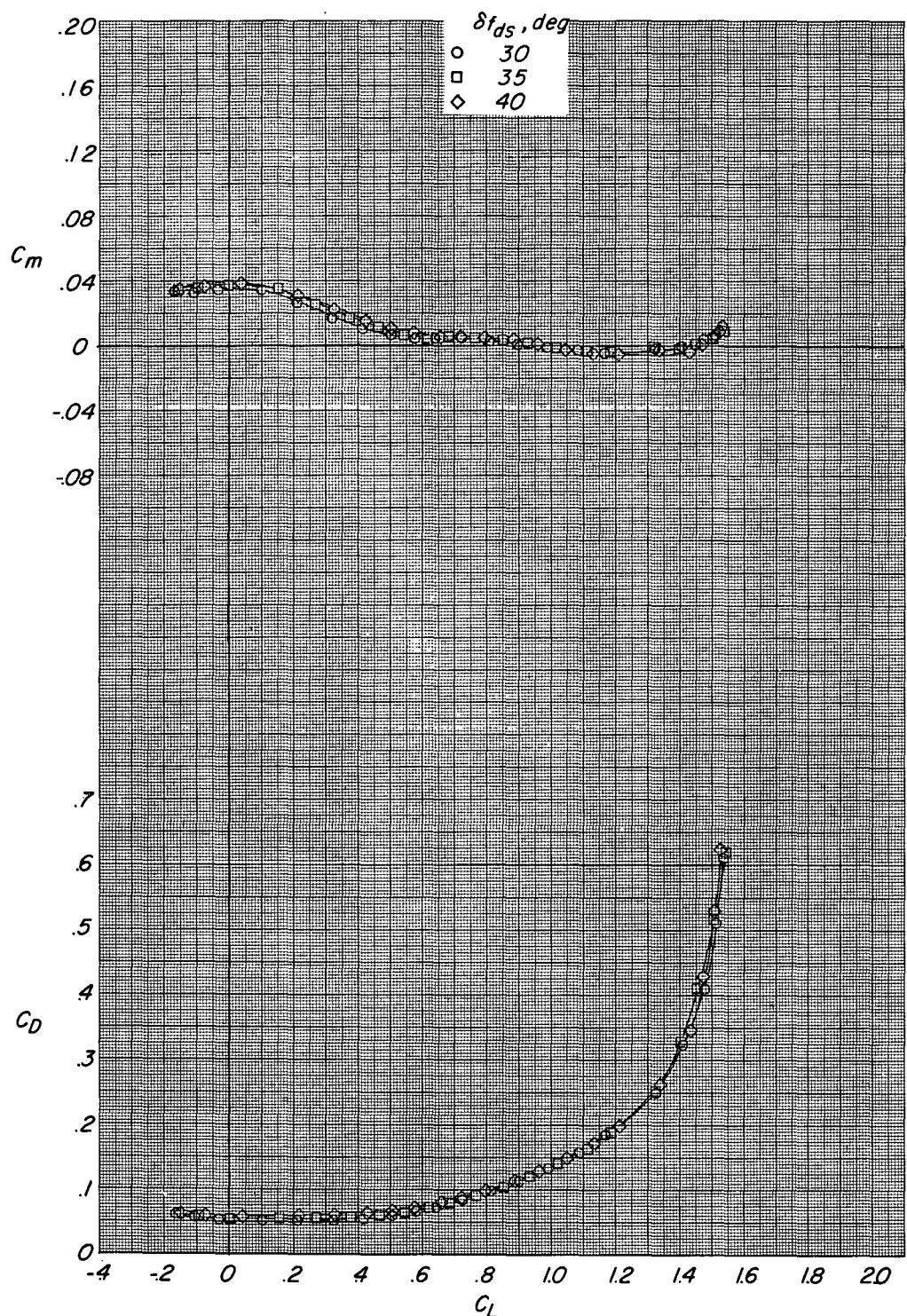


Figure 42.- Concluded.

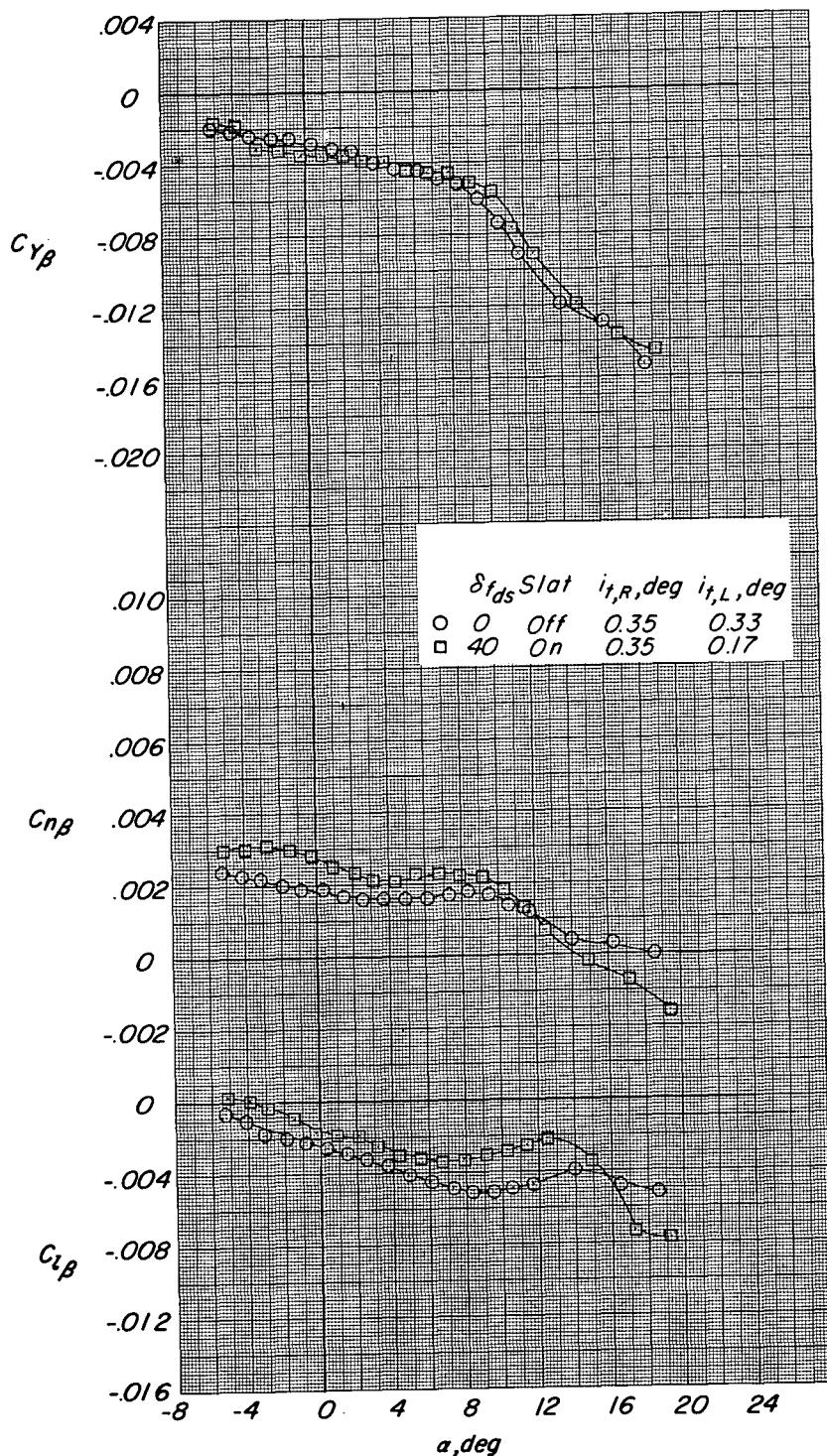


Figure 43.- Effect of leading- and trailing-edge high-lift devices on the lateral stability derivative. WBNH₁V₁; $\Lambda = 25^\circ$.

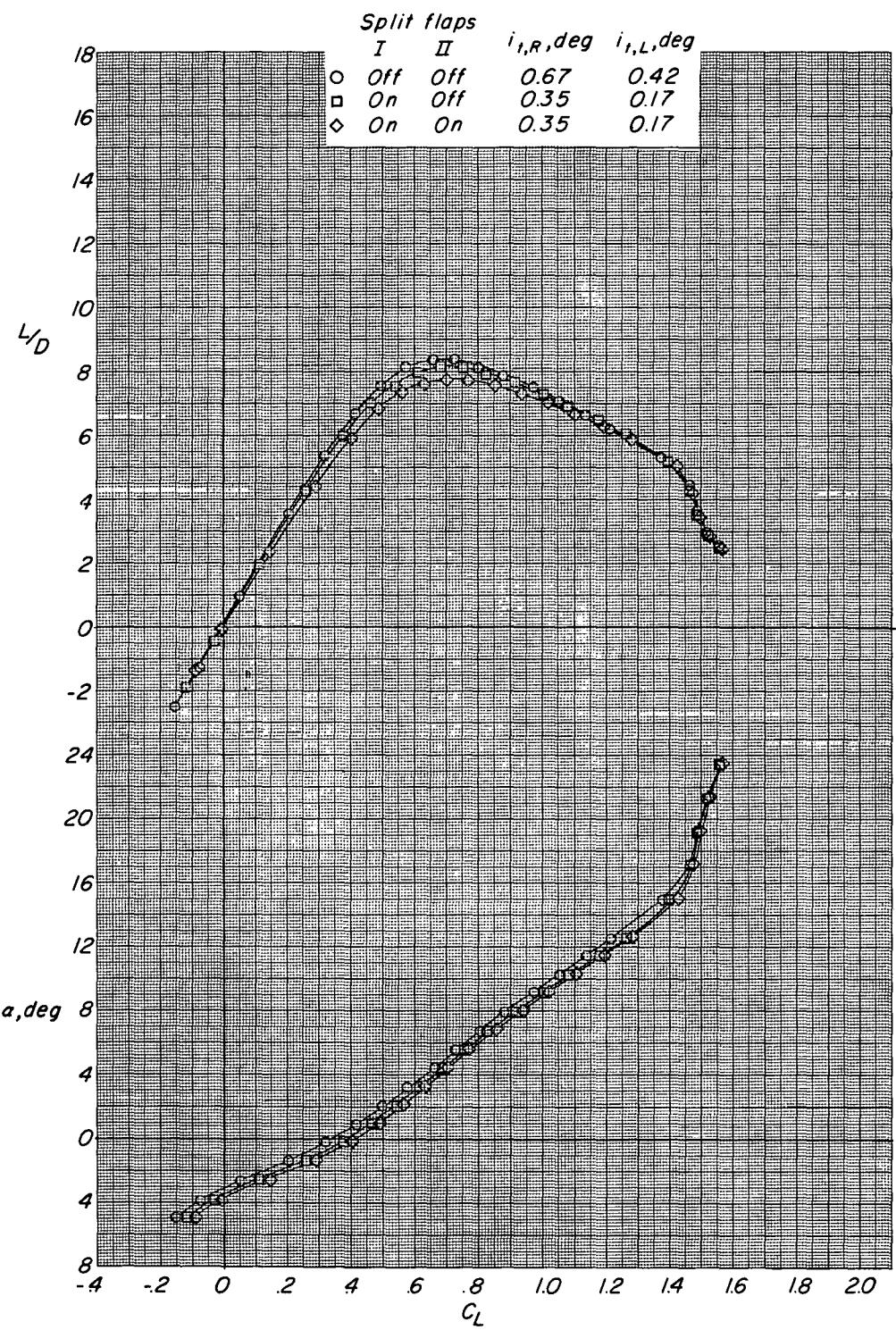


Figure 44.- Effect of deflection of split flaps on the longitudinal aerodynamic characteristics.
Slat on. WBNH₁V1; $\Lambda = 25^\circ$; $\delta_{fds} = 40^\circ$.

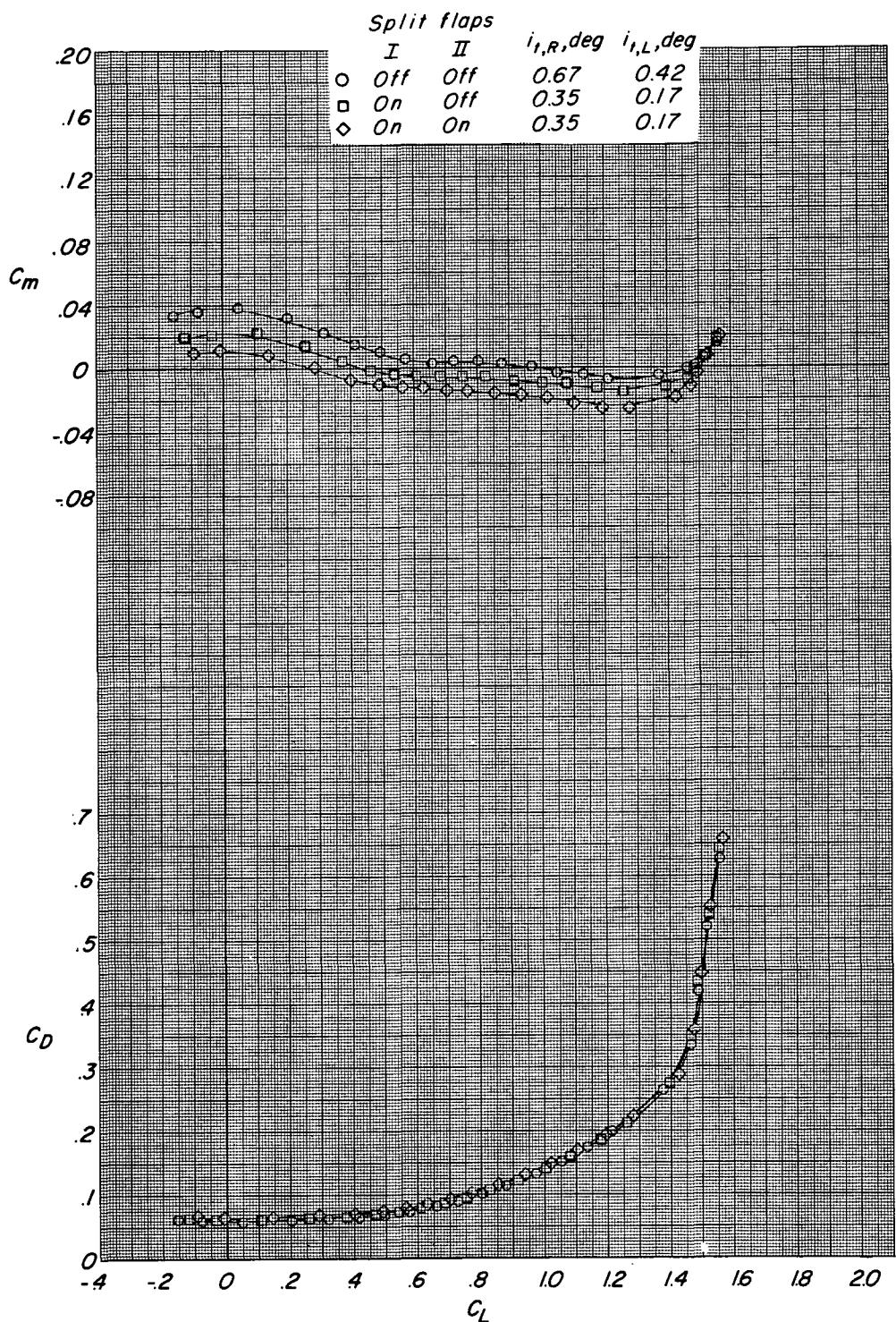


Figure 44.- Concluded.

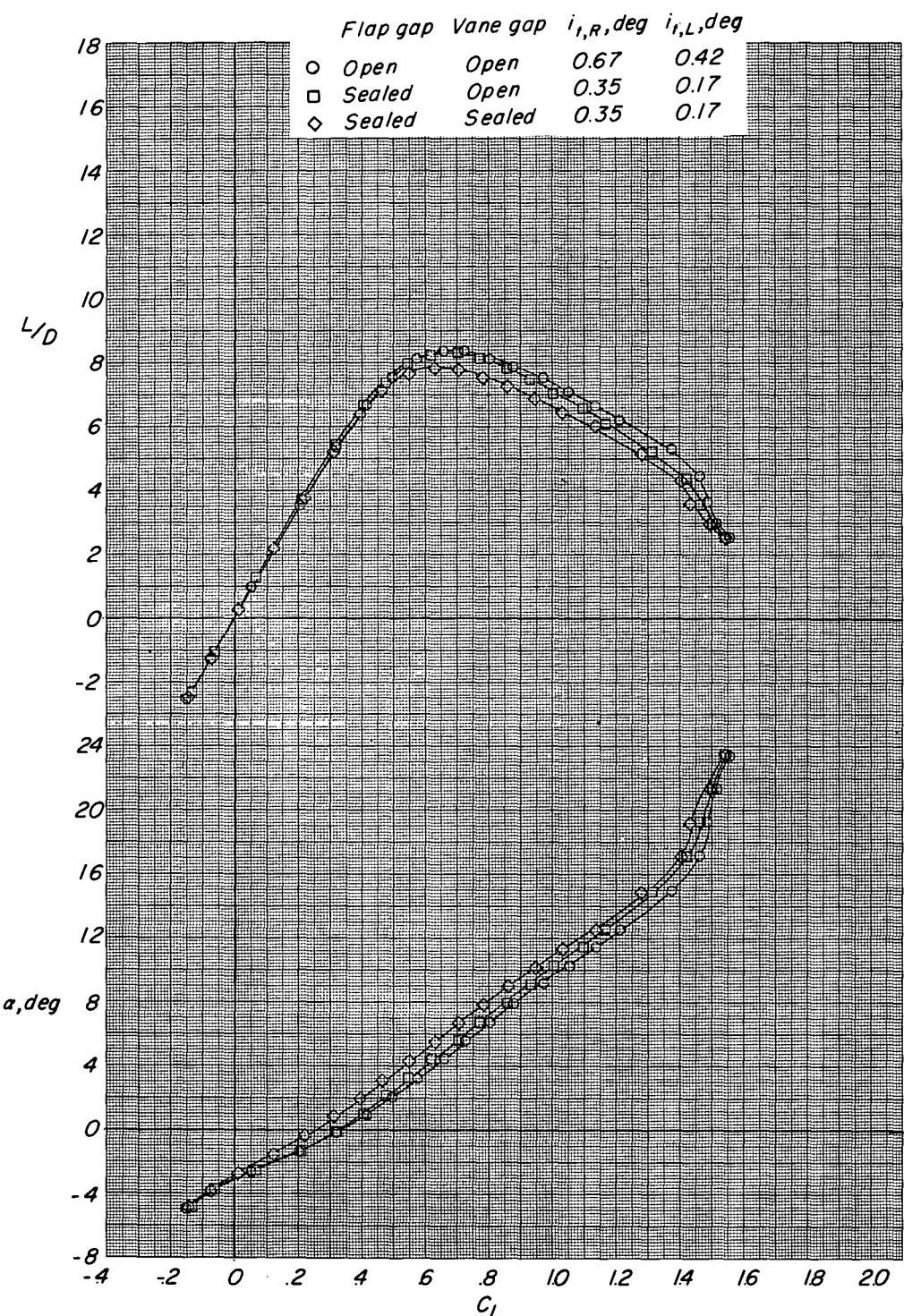


Figure 45.- Effect of sealing the flap and vane gaps on the longitudinal aerodynamic characteristics. Slat on. WBNH₁V₁; $\Lambda = 25^\circ$; $\delta_{f_{ds}} = 40^\circ$.

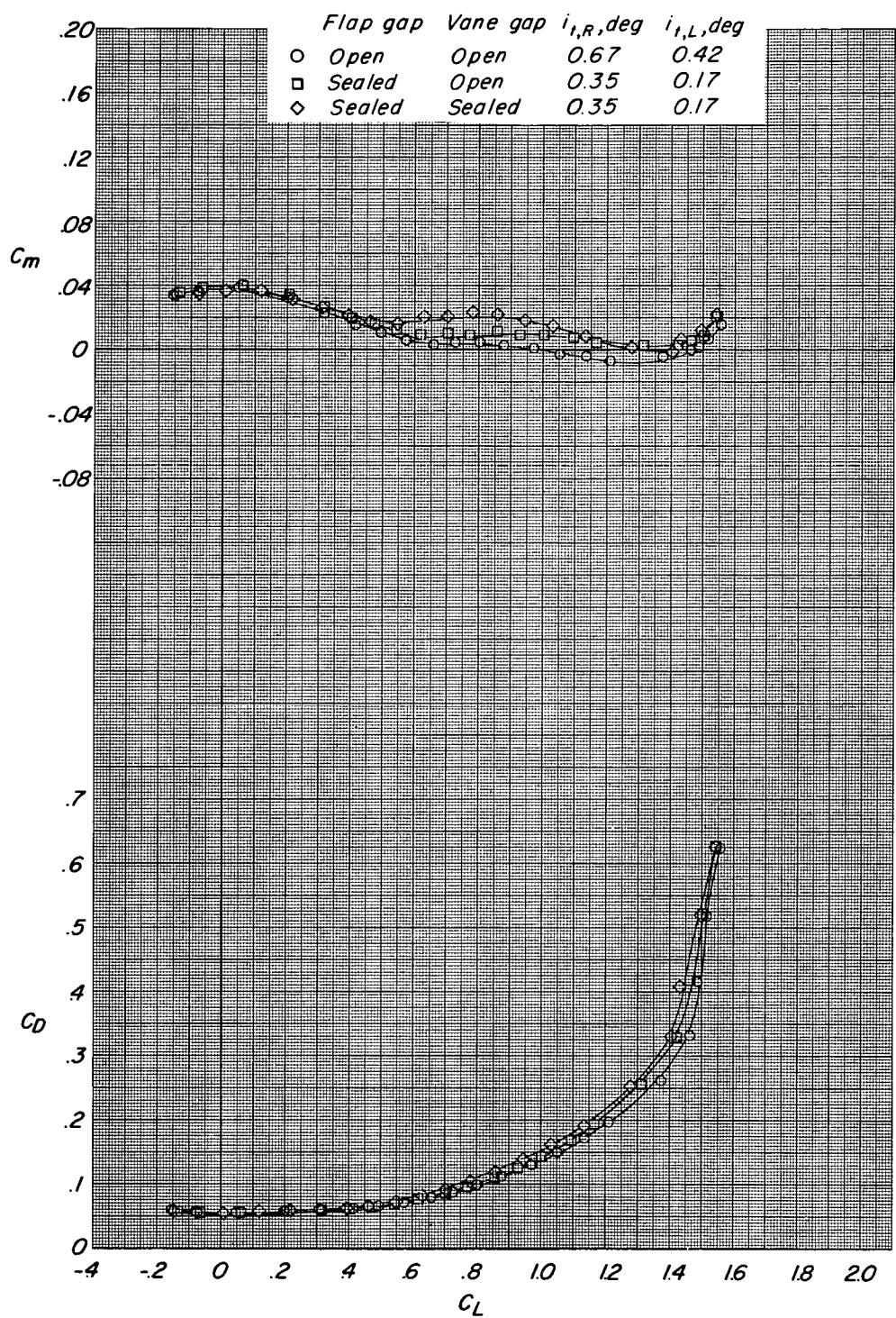


Figure 45.- Concluded.

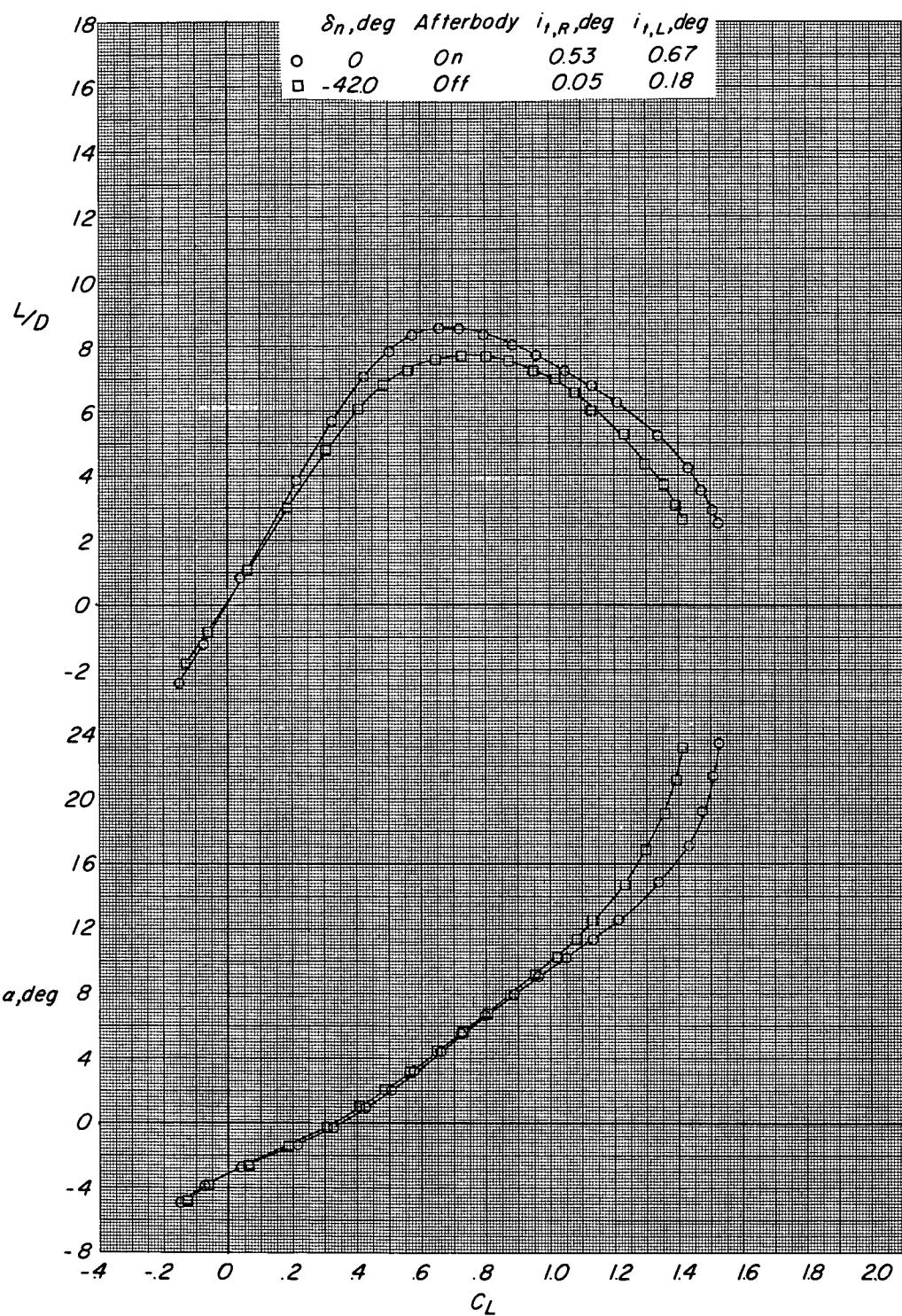


Figure 46.- Effect of forewing droop angle on the longitudinal aerodynamic characteristics.
 Slat on. WBNH1V1; $\Lambda = 25^\circ$; $\delta_{f\Delta s} = 40^\circ$.

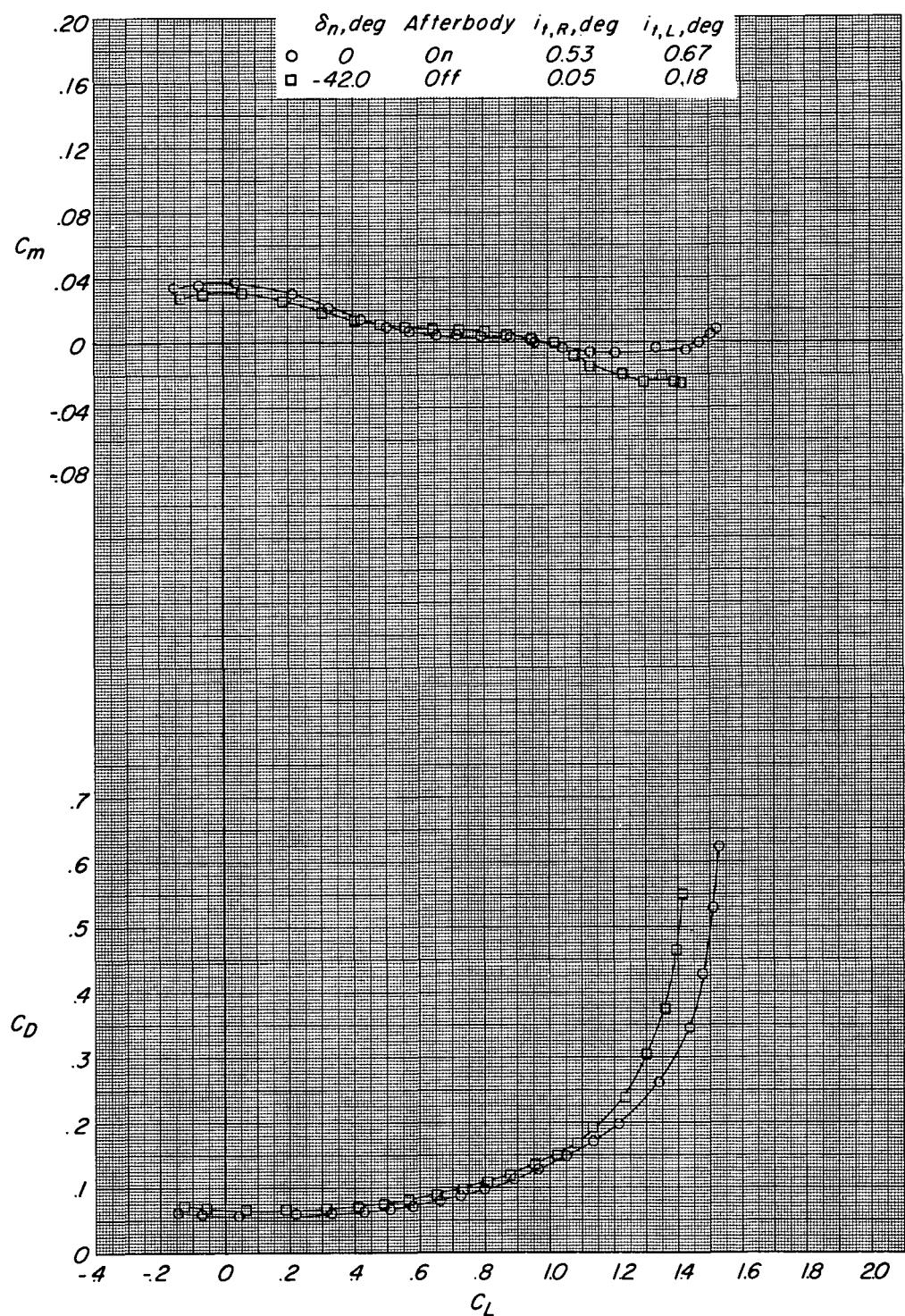


Figure 46.- Concluded.

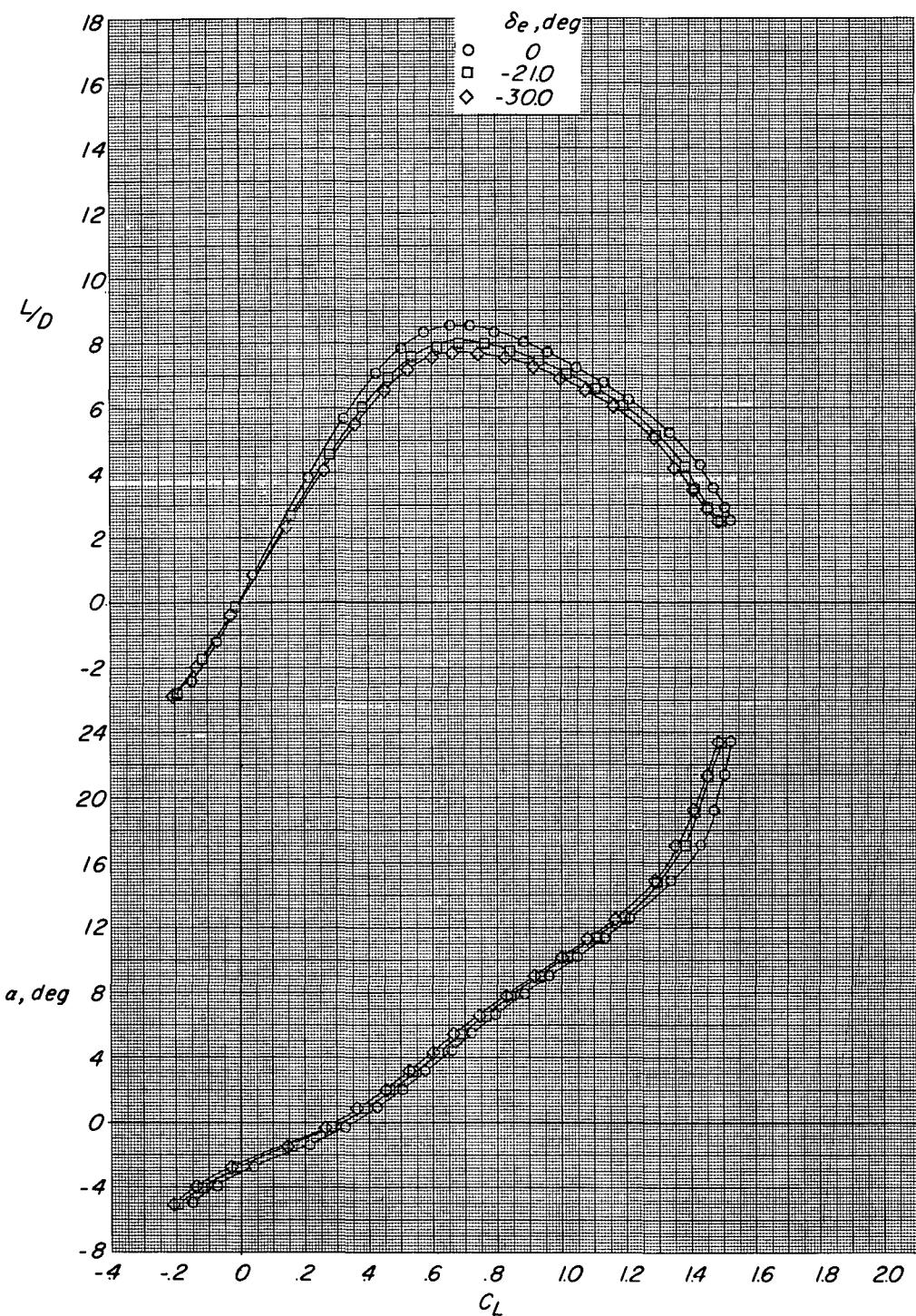


Figure 47.- Effect of elevator deflection angles on the longitudinal aerodynamic characteristics.
Slat on. WBNH₁V1A; $\Lambda = 25^\circ$; $i_{t,R} = 0.53^\circ$; $i_{t,L} = 0.67^\circ$; $\delta_{f_{ds}} = 40^\circ$.

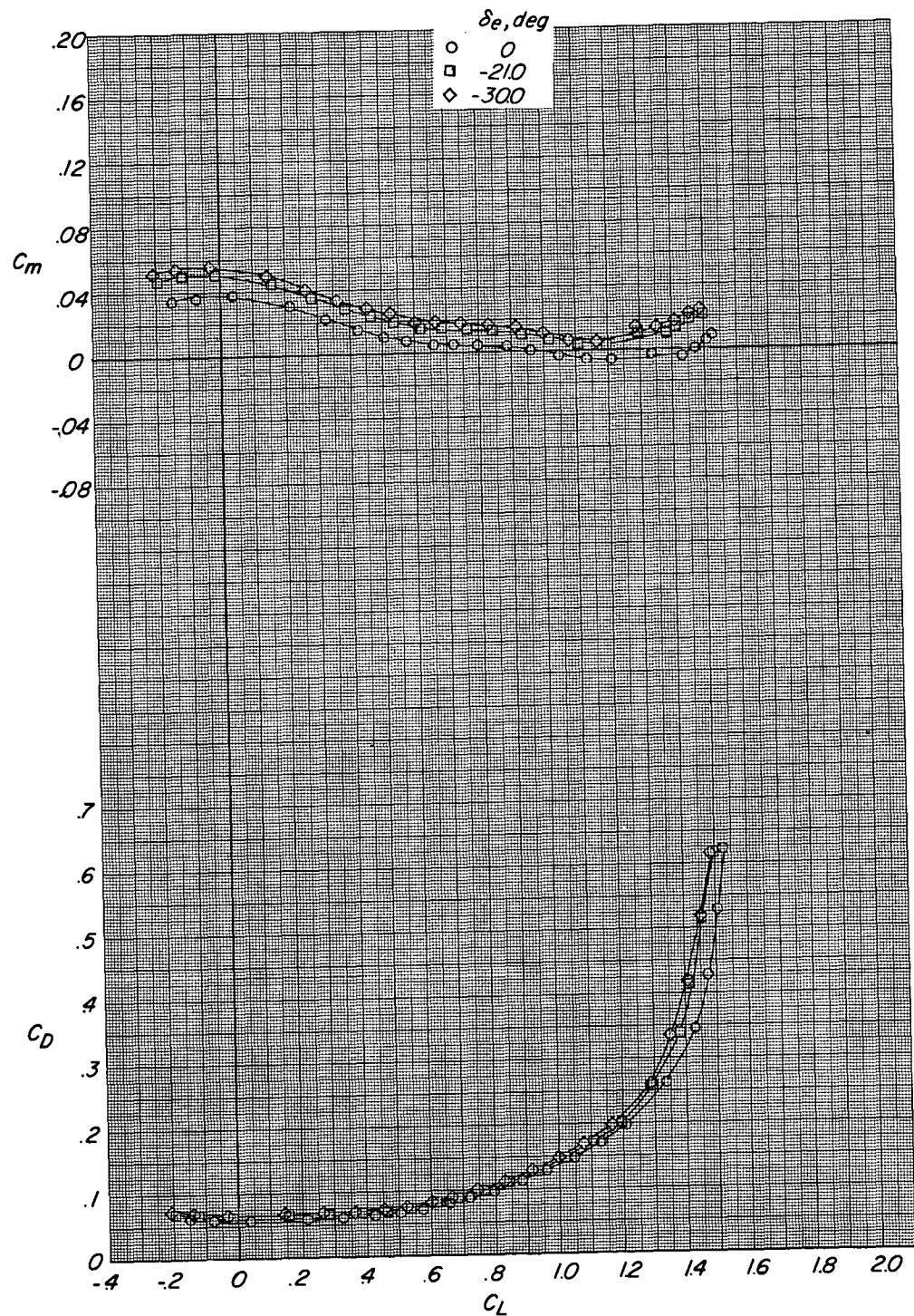


Figure 47.- Concluded.

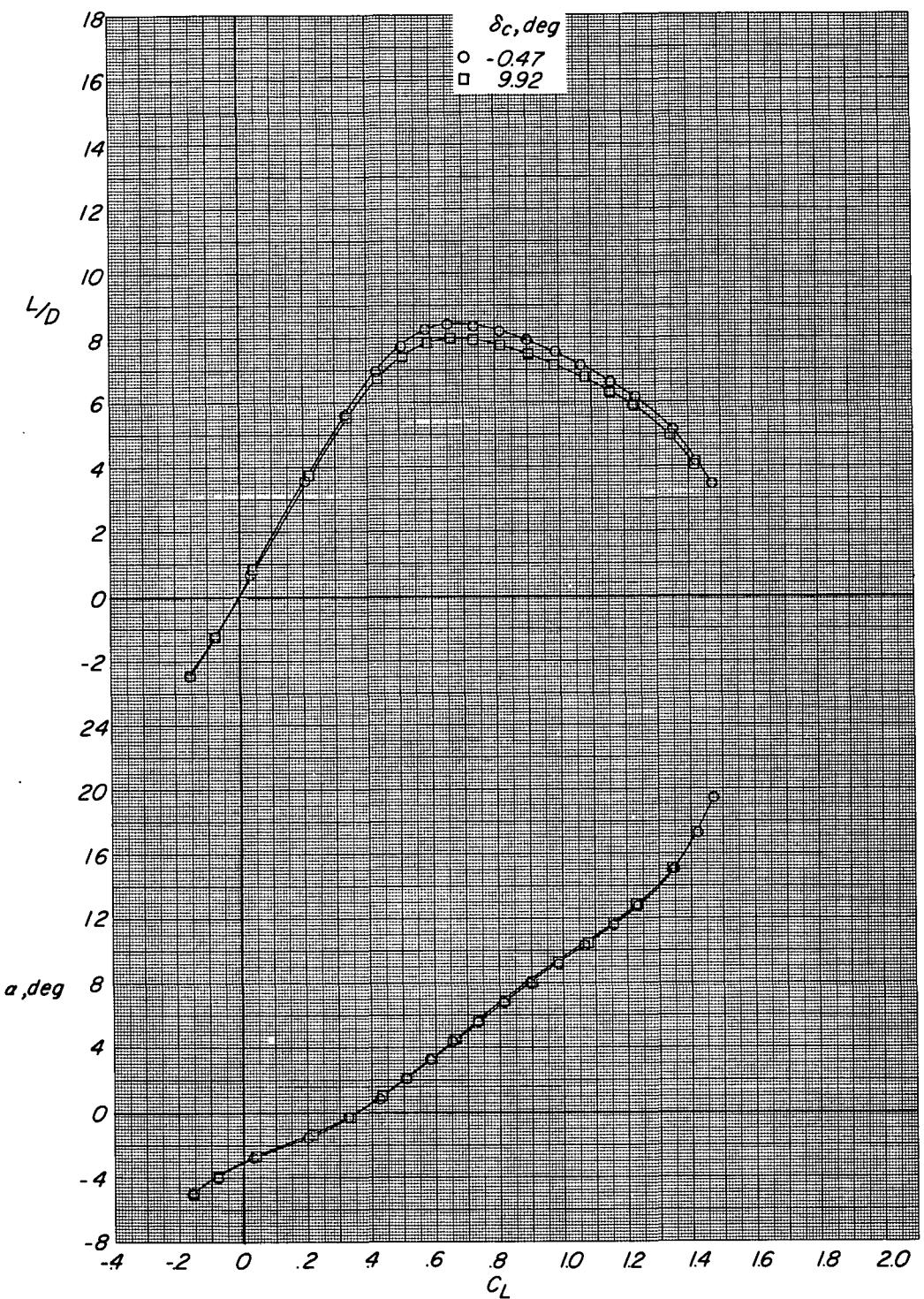


Figure 48.- Effect of canard deflection angles on the longitudinal aerodynamic characteristics.
Slat on. WBNH₁V₁CA; $\Lambda = 25^\circ$; $i_{t,R} = 0.53^\circ$; $i_{t,L} = 0.67^\circ$; $\delta_{f,ds} = 40^\circ$.

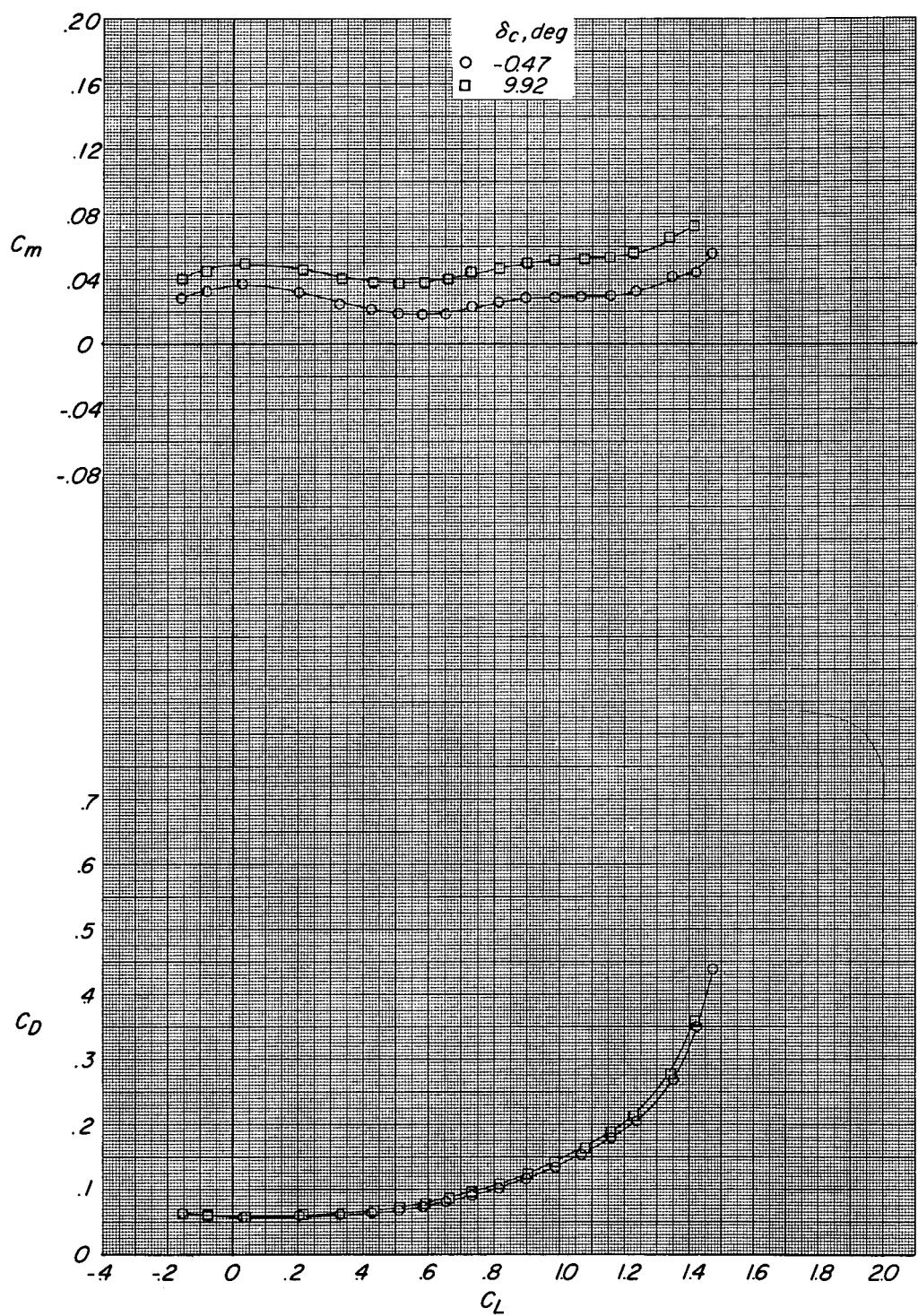


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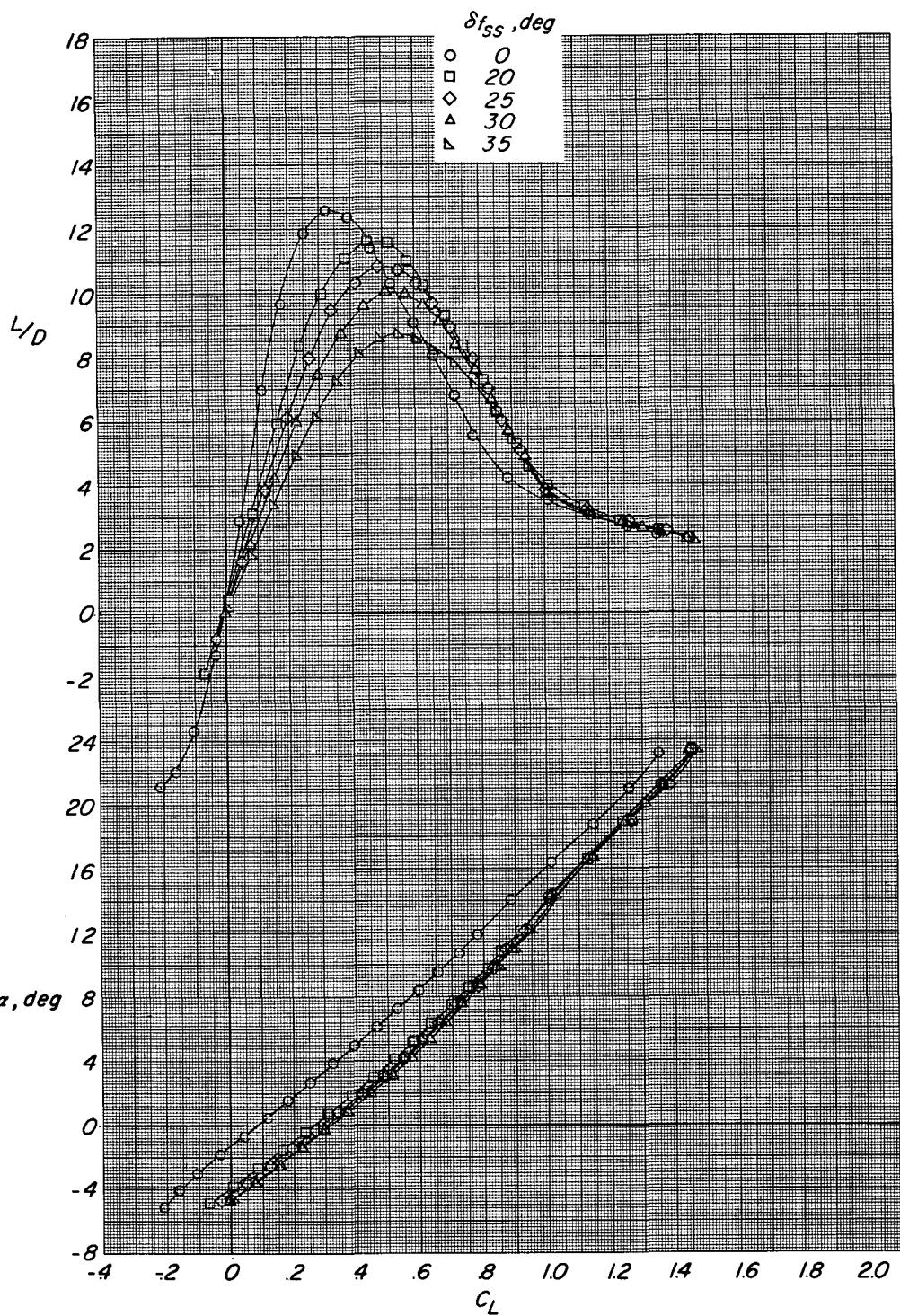


Figure 49.- Effect of deflections of the single slotted flap on the longitudinal aerodynamic characteristics. Slat off. WBNH₁V₁A; $\Lambda = 25^\circ$; $i_{t,R} = 0.53$; $i_{t,L} = 0.67^\circ$.

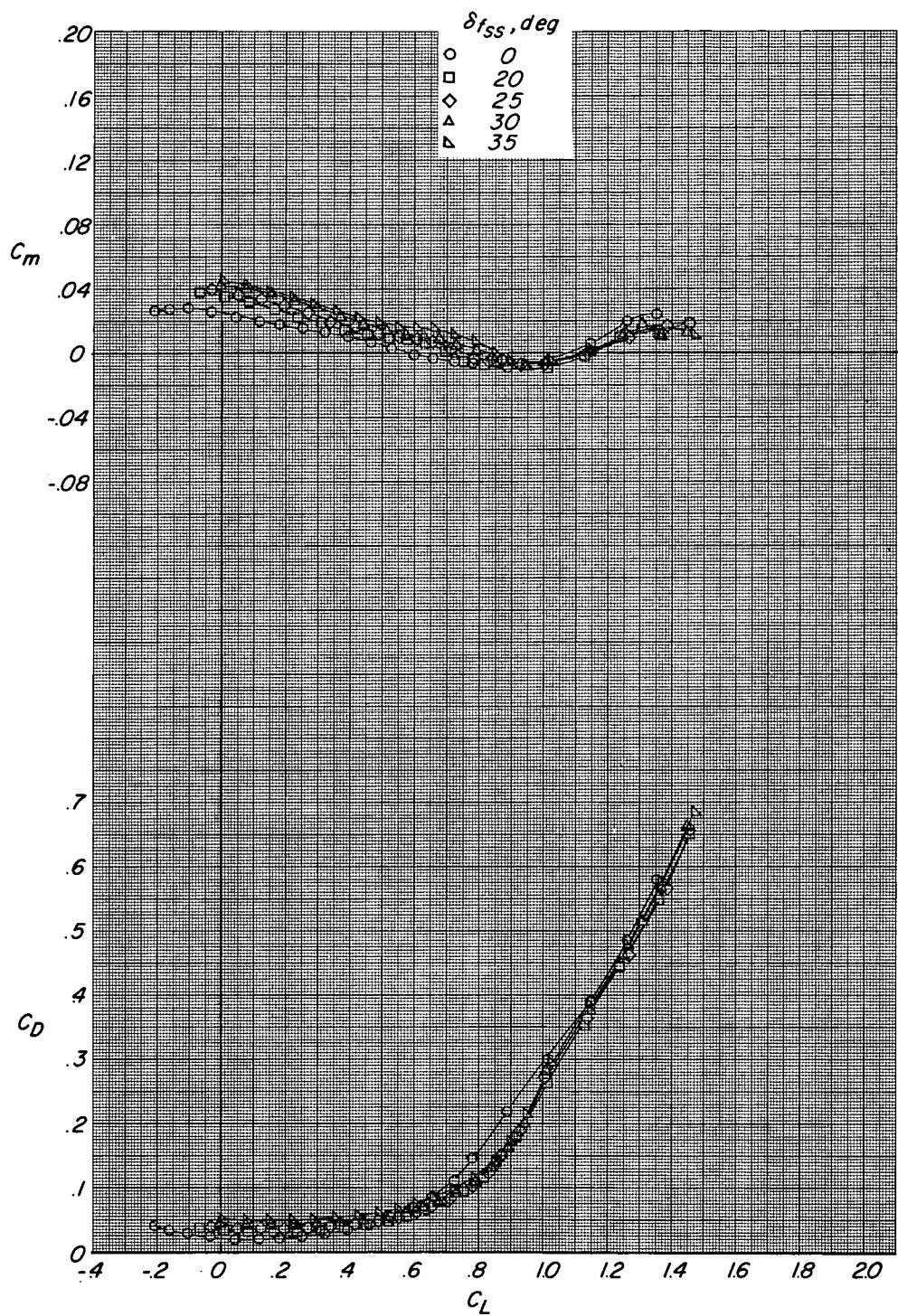


Figure 49.- Concluded.

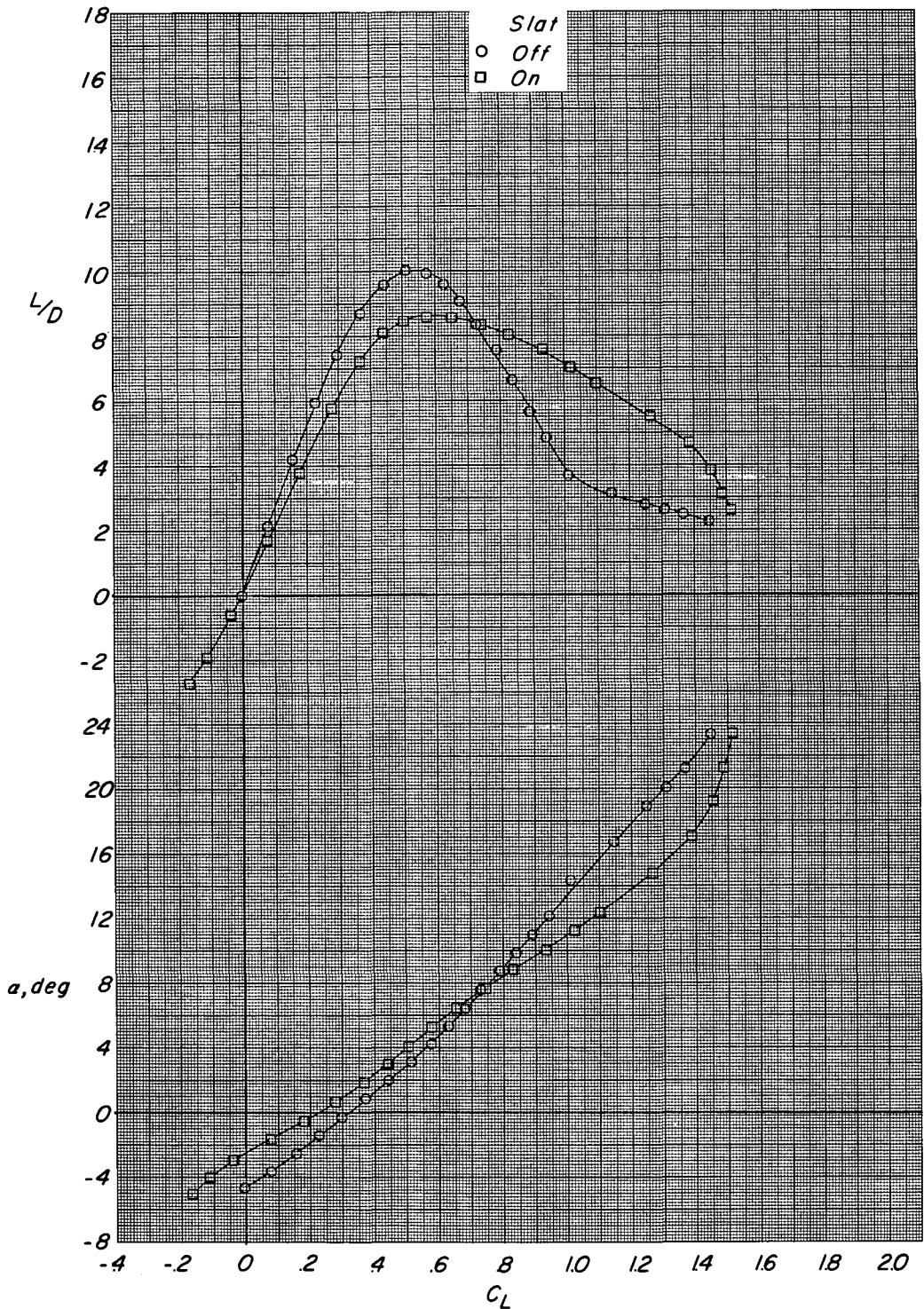


Figure 50.- Effect of slat on the longitudinal aerodynamic characteristics. WBNH₁V₁A;
 $\Lambda = 25^\circ$; $i_{t,R} = 0.53^\circ$; $i_{t,L} = 0.67^\circ$; $\delta_{f_{ds}} = 30^\circ$.

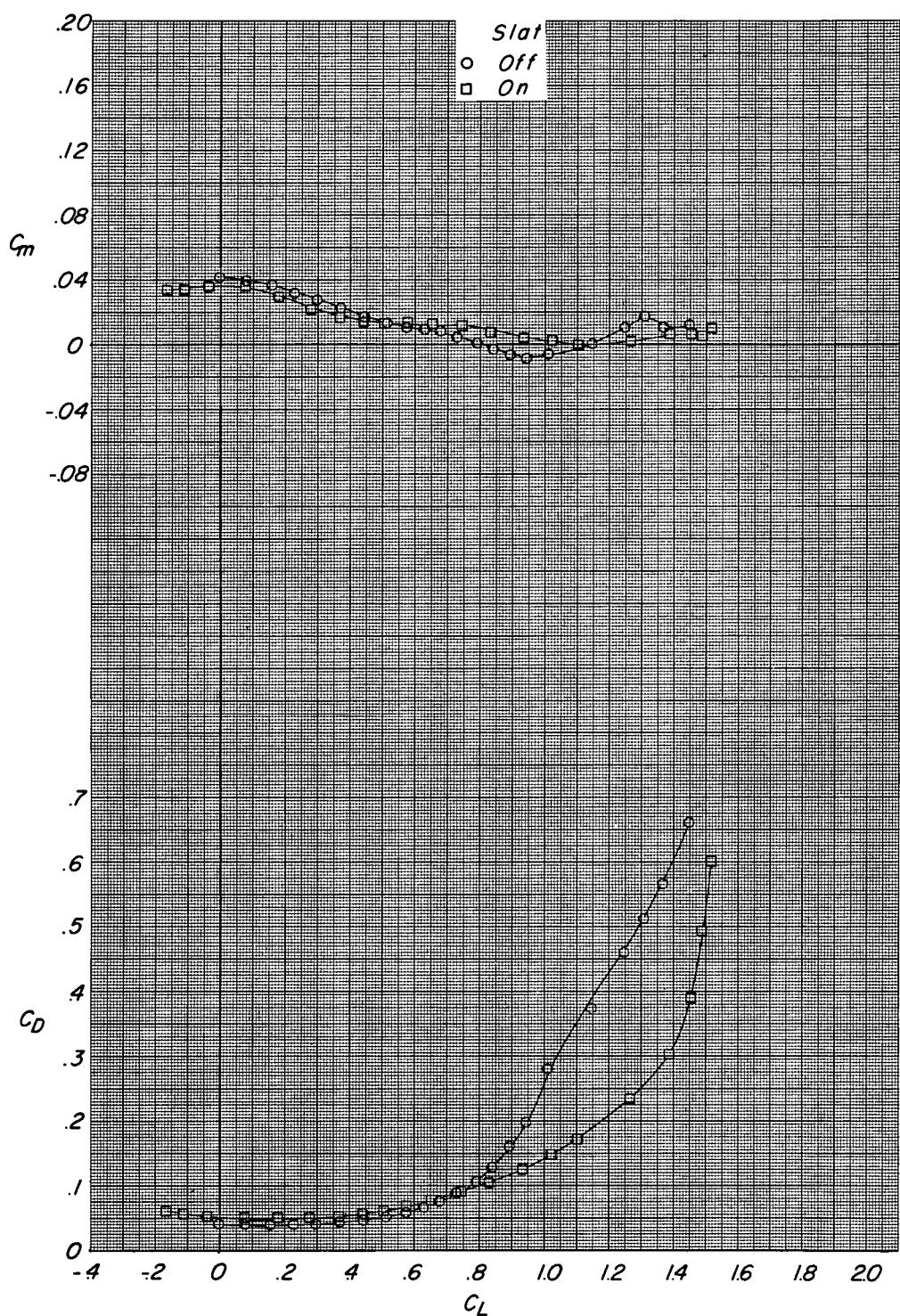


Figure 50.- Concluded.

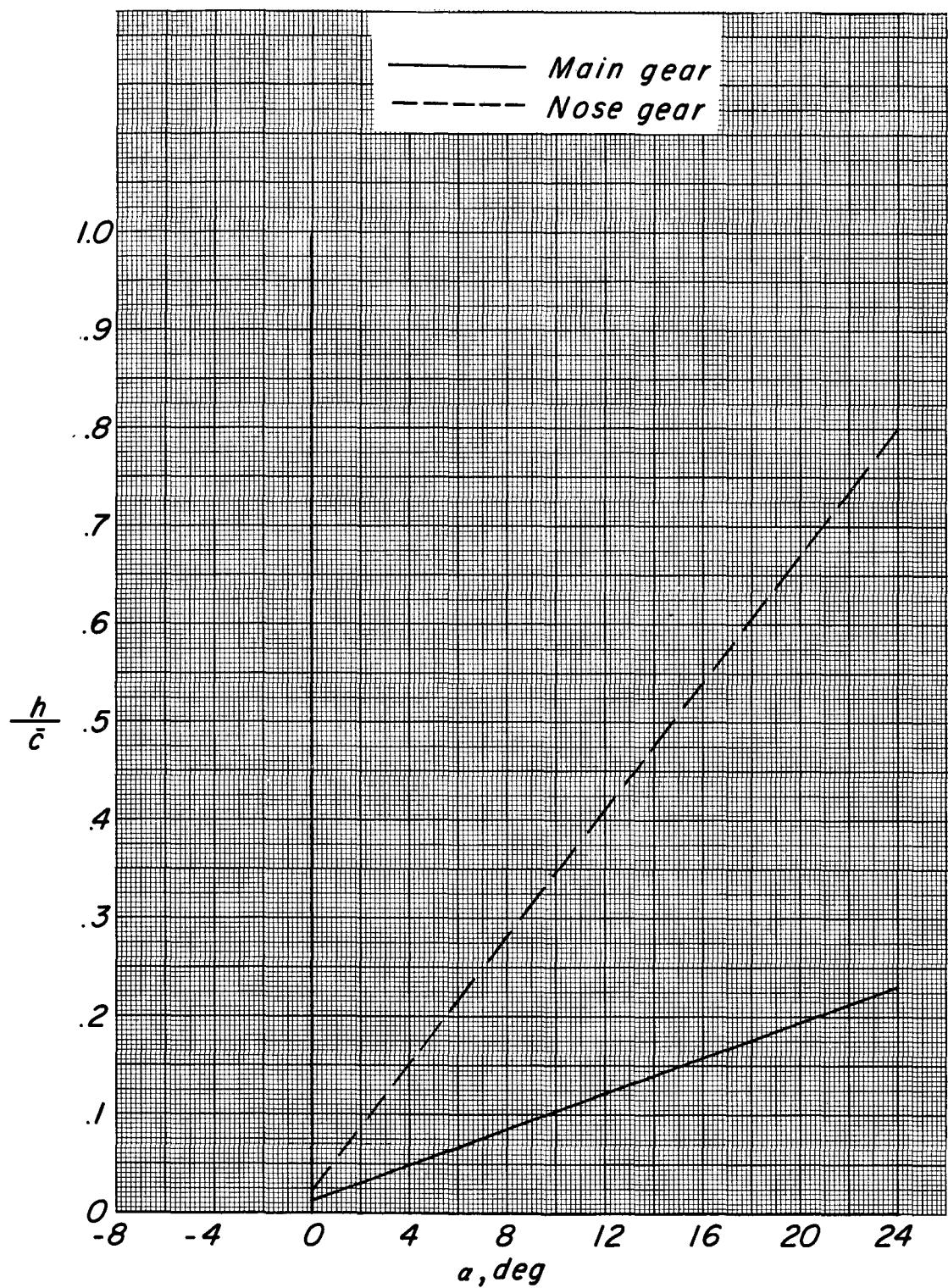


Figure 51.- Variation of height of the main and nose landing gears above the ground board with angle of attack.

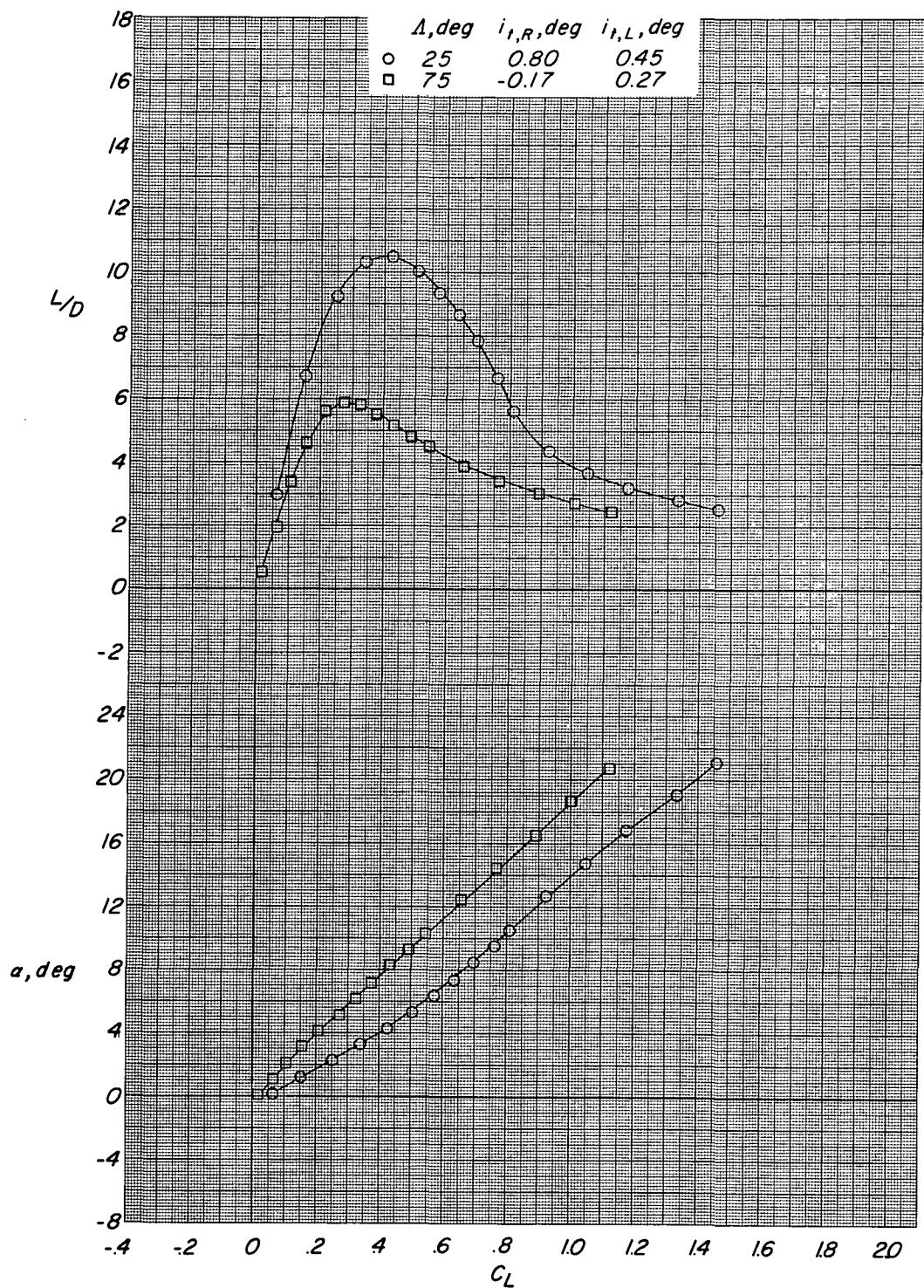


Figure 52.- Effect of wing leading-edge sweep on the longitudinal aerodynamic characteristics in ground effect. Landing gears on. WBNH₁V₁.

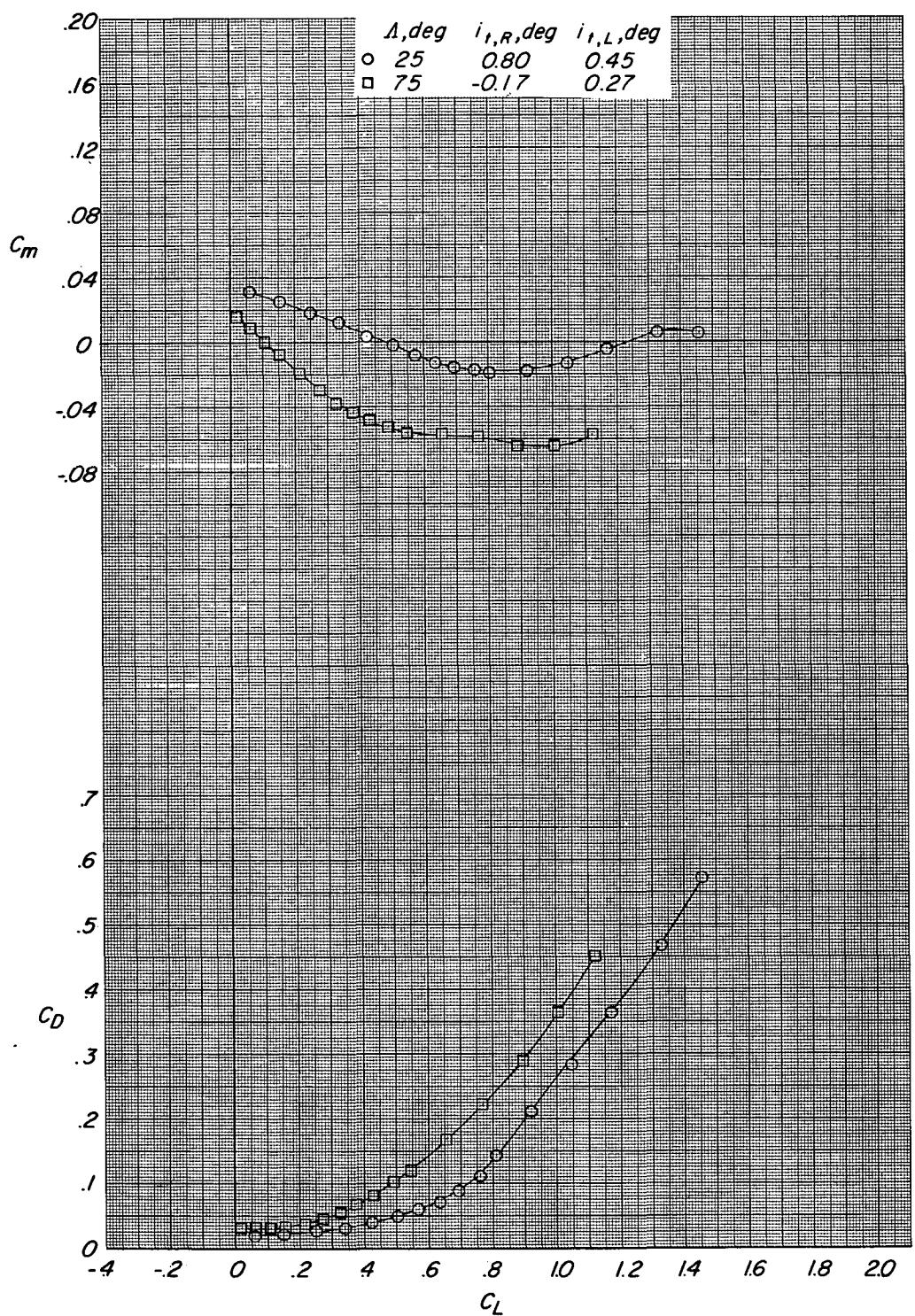


Figure 52.- Concluded.

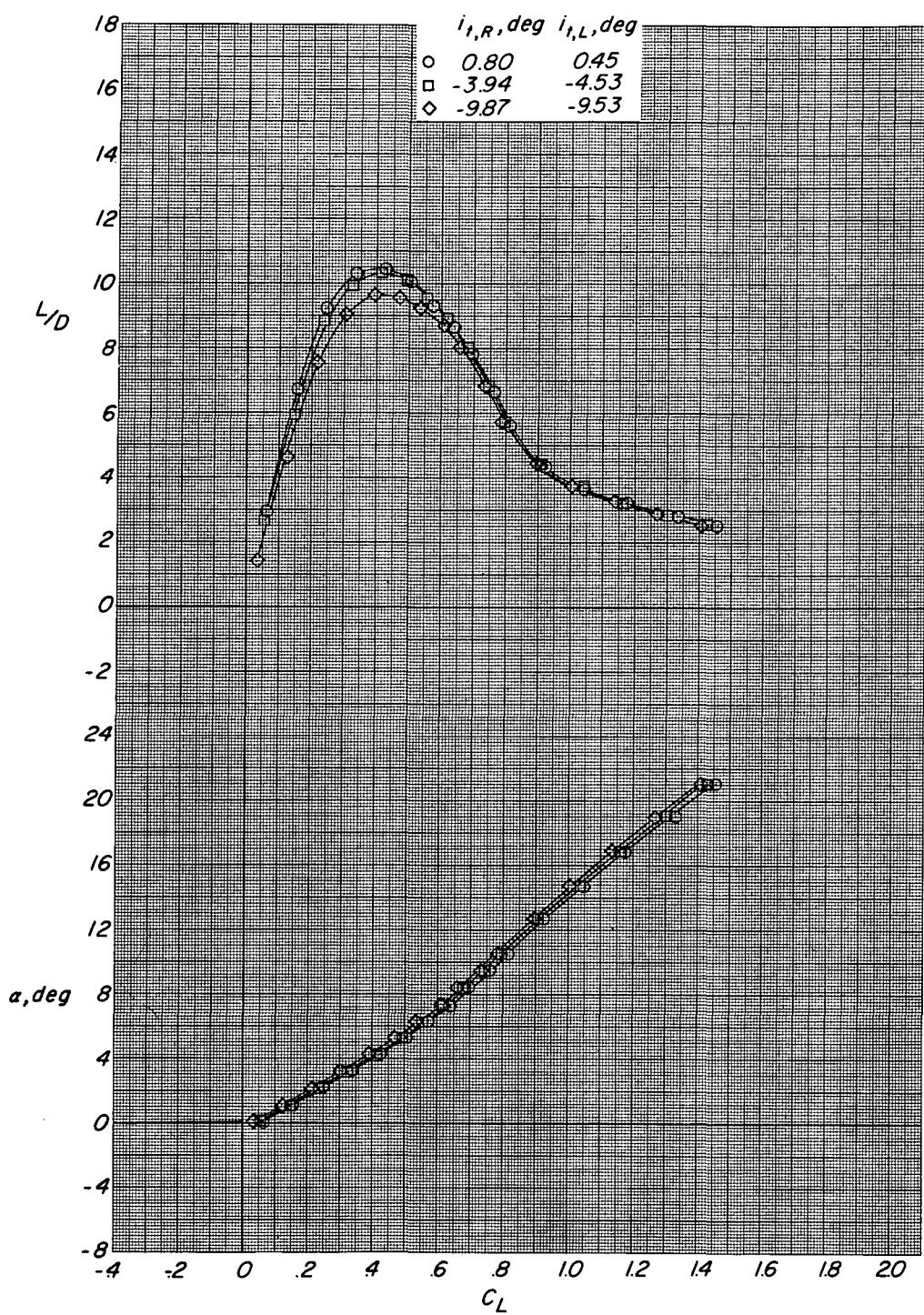


Figure 53.- Effect of horizontal-tail incidence angle on the longitudinal aerodynamic characteristics in ground effect with the landing gears on and the auxiliary wing panel swept 25° . WENH₁V₁.

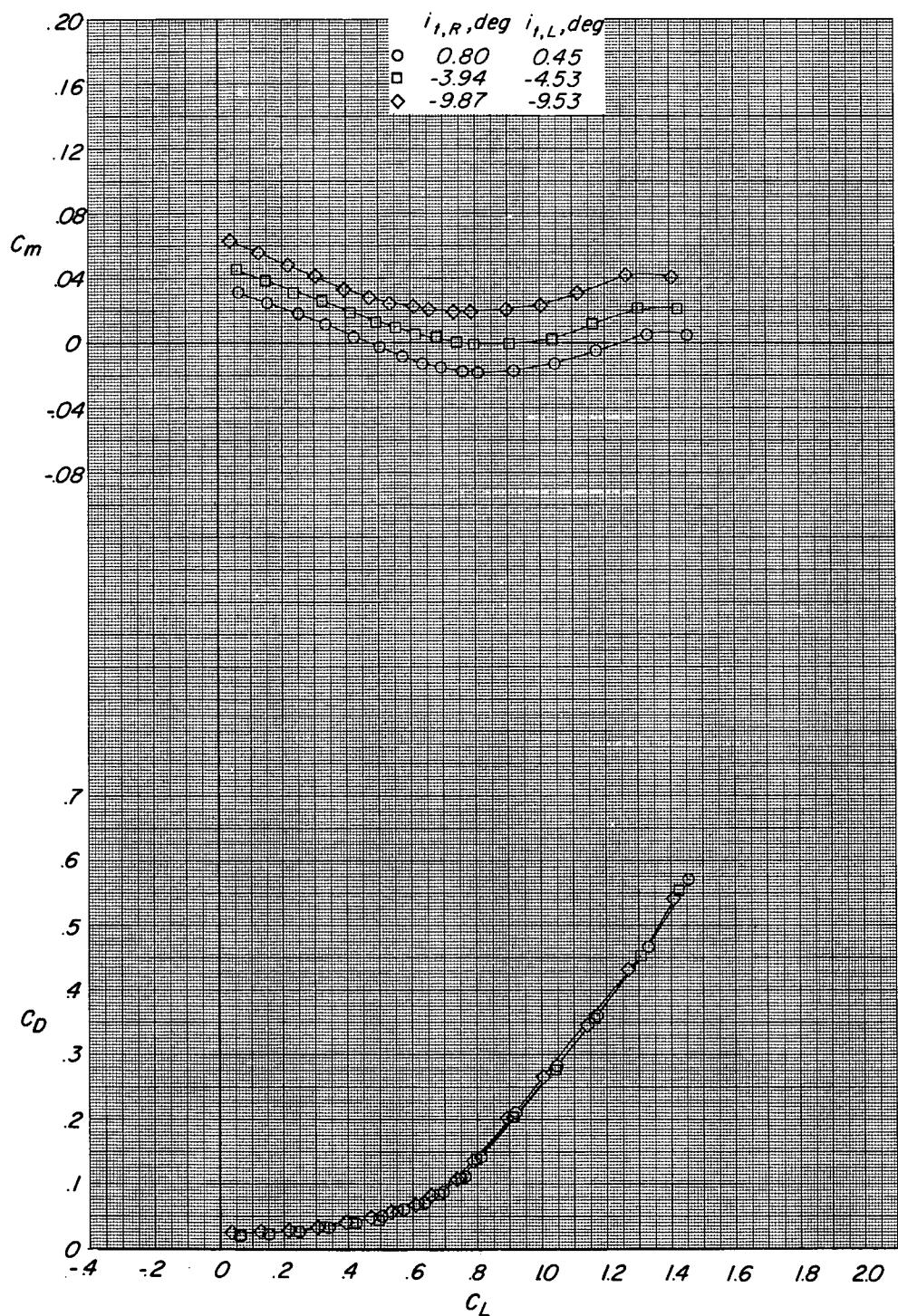


Figure 53.- Concluded.

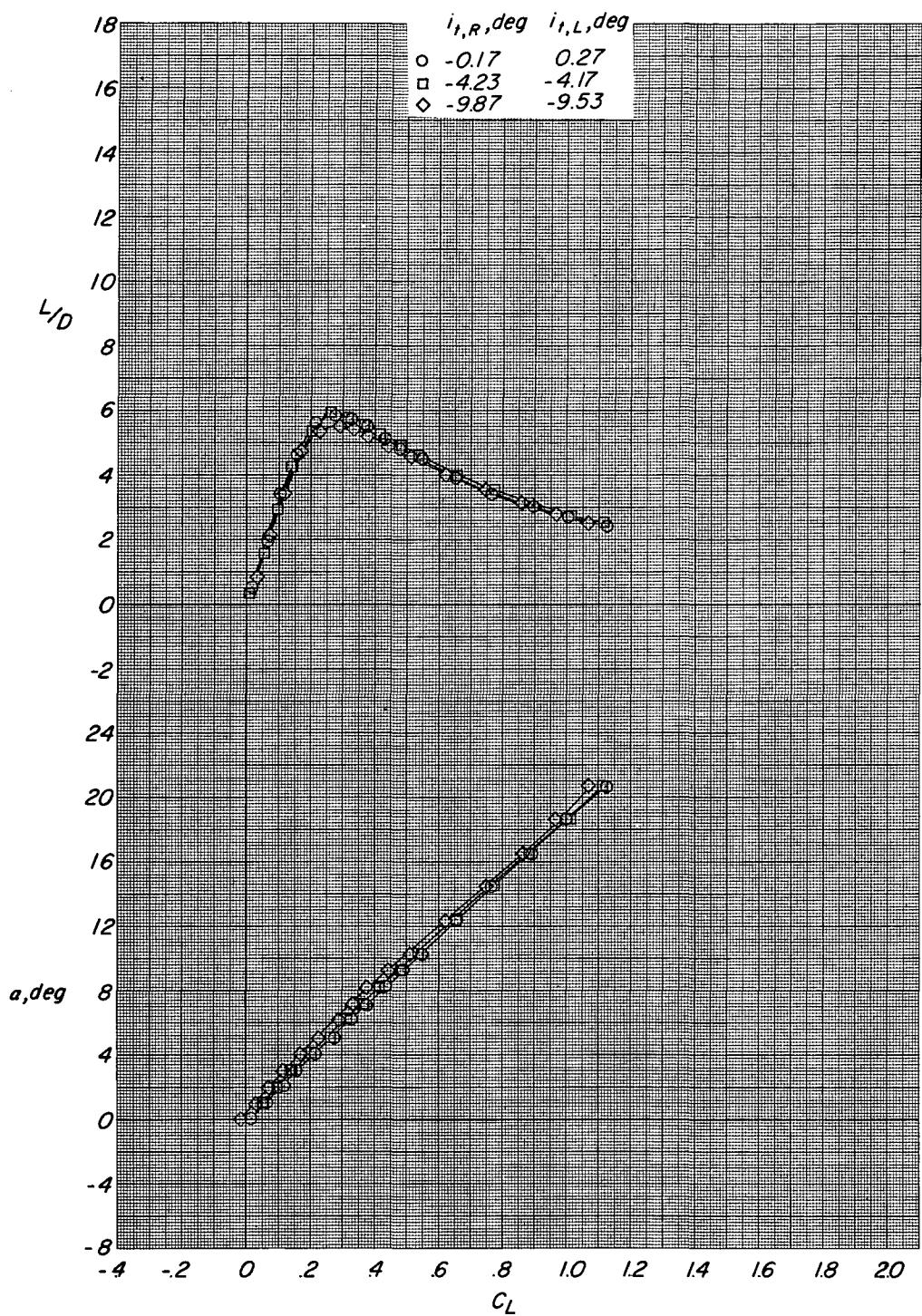


Figure 54.- Effect of horizontal-tail incidence angle on the longitudinal aerodynamic characteristics in ground effect with the landing gears on and the auxiliary wing panels swept 75° . WBNH₁V₁.

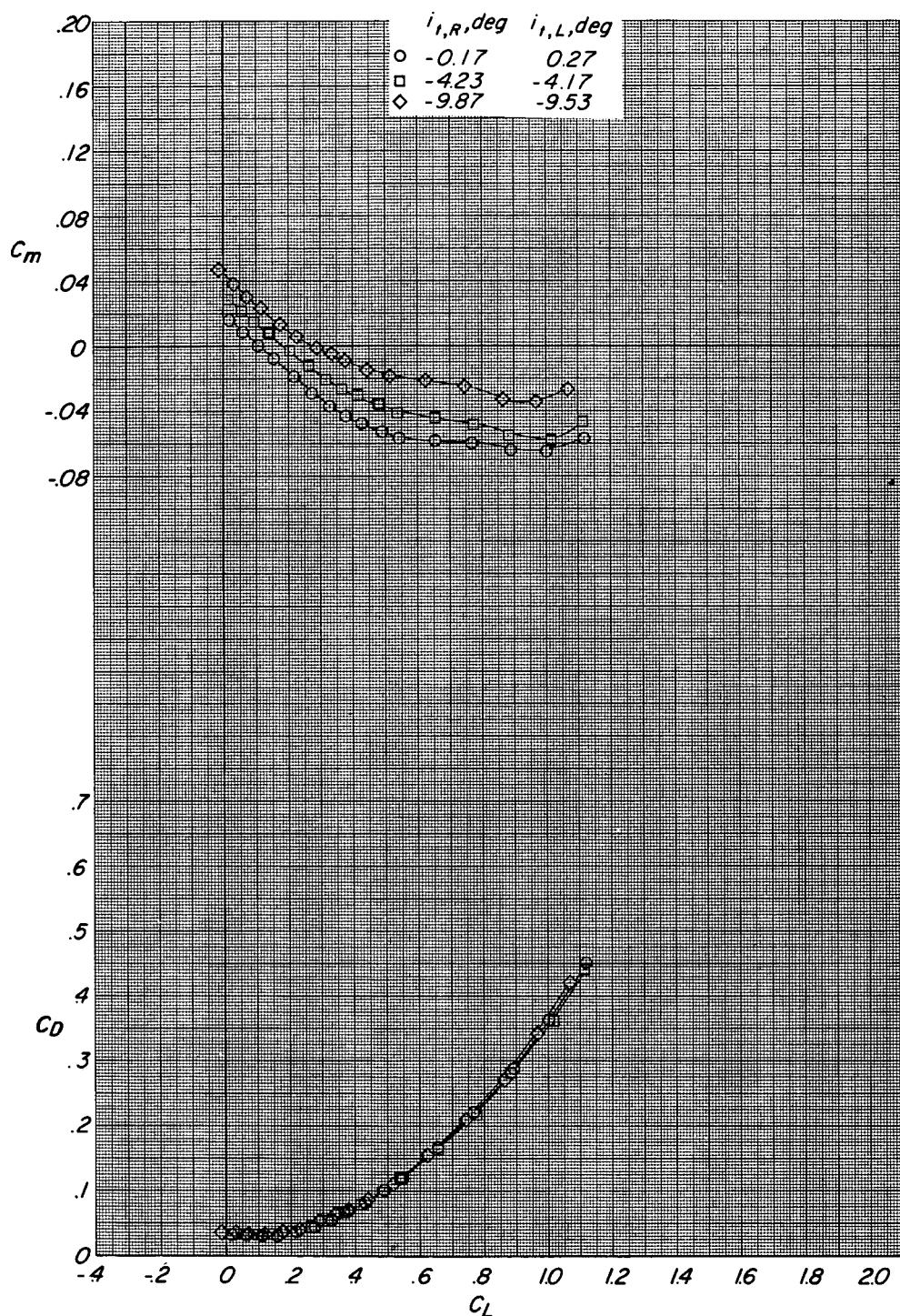


Figure 54.- Concluded.

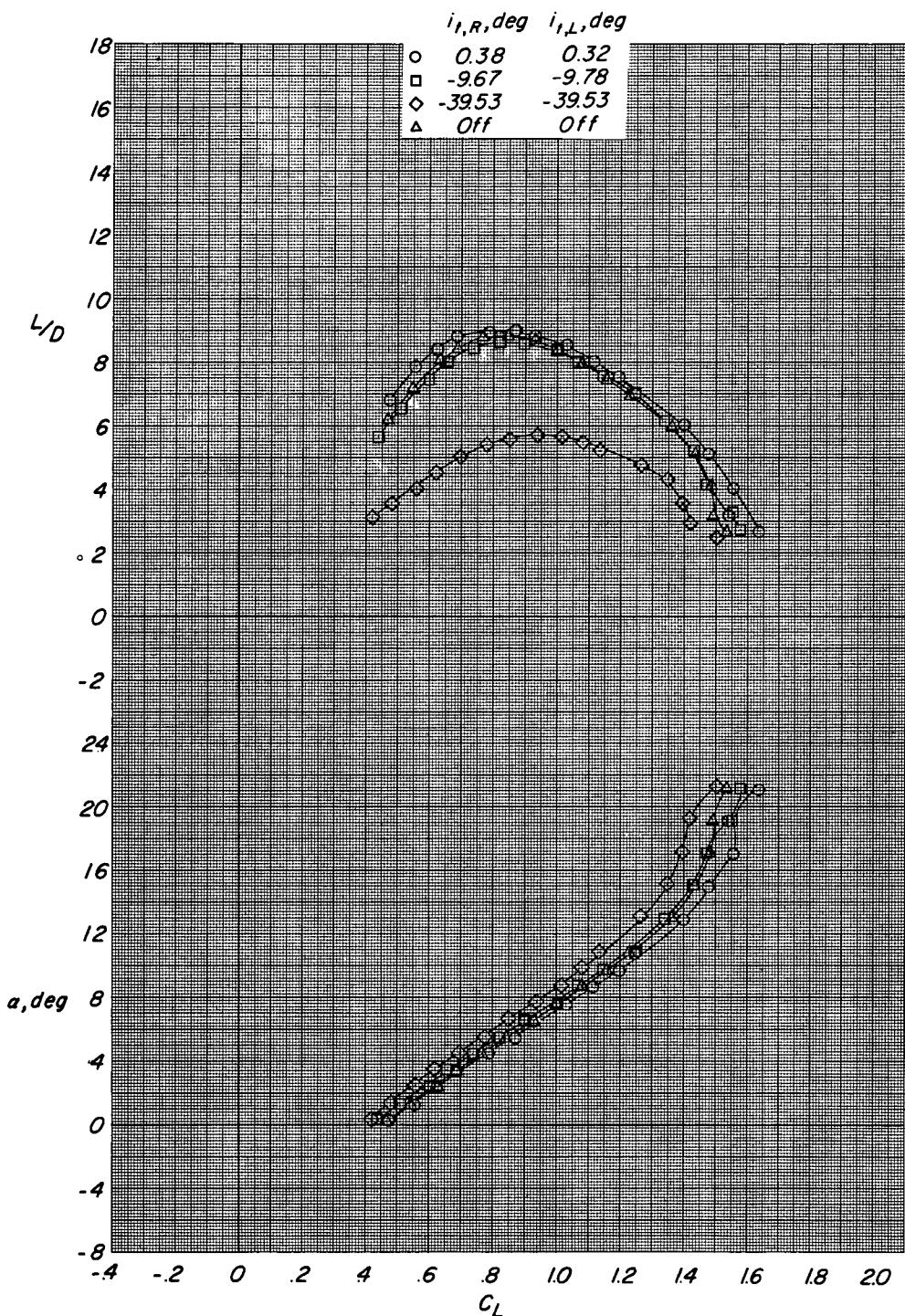


Figure 55.- Effect of horizontal-tail incidence angle on the longitudinal aerodynamic characteristics in ground effect with slat and landing gears on, the auxiliary wing panels swept 25°, and the double slotted flaps deflected 40°. WBNH₁V₁.

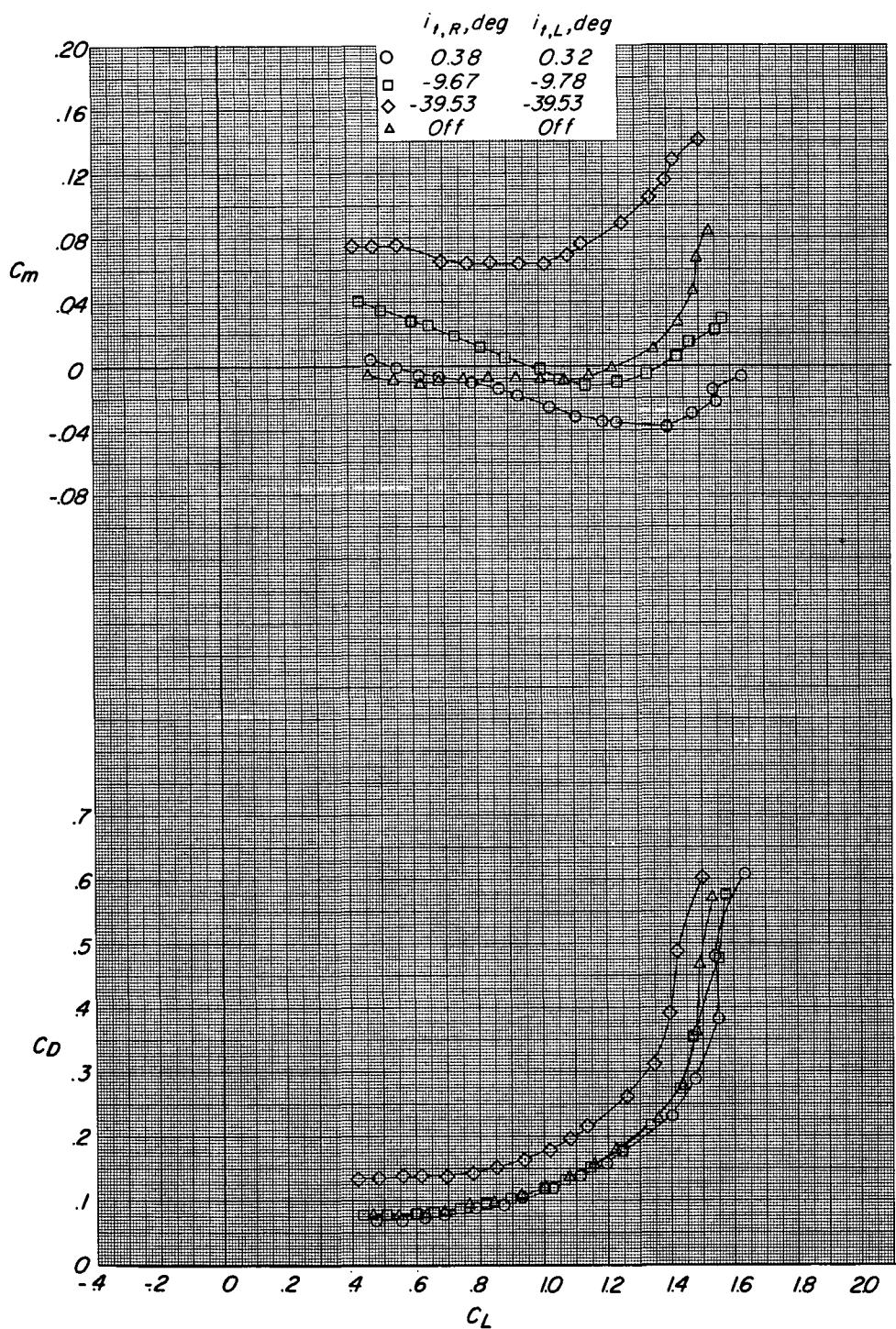


Figure 55.- Concluded.

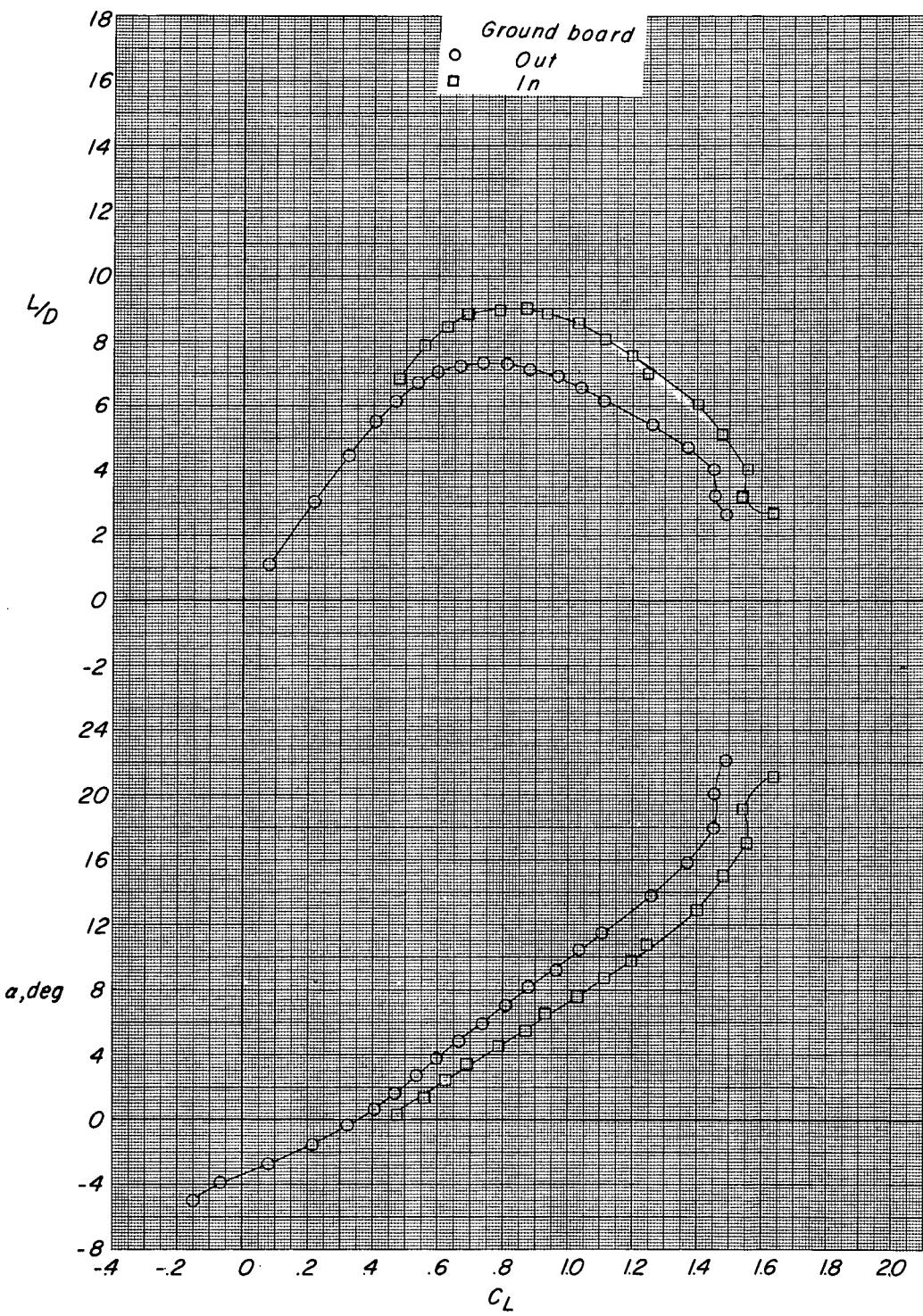


Figure 56.- Effect of ground board on the longitudinal aerodynamic characteristics with slat and landing gears on. WBNH₁V₁; $\Lambda = 25^\circ$; $i_{t,R} = 0.38^\circ$; $i_{t,L} = 0.32^\circ$; $\delta_{f_{ds}} = 40^\circ$.

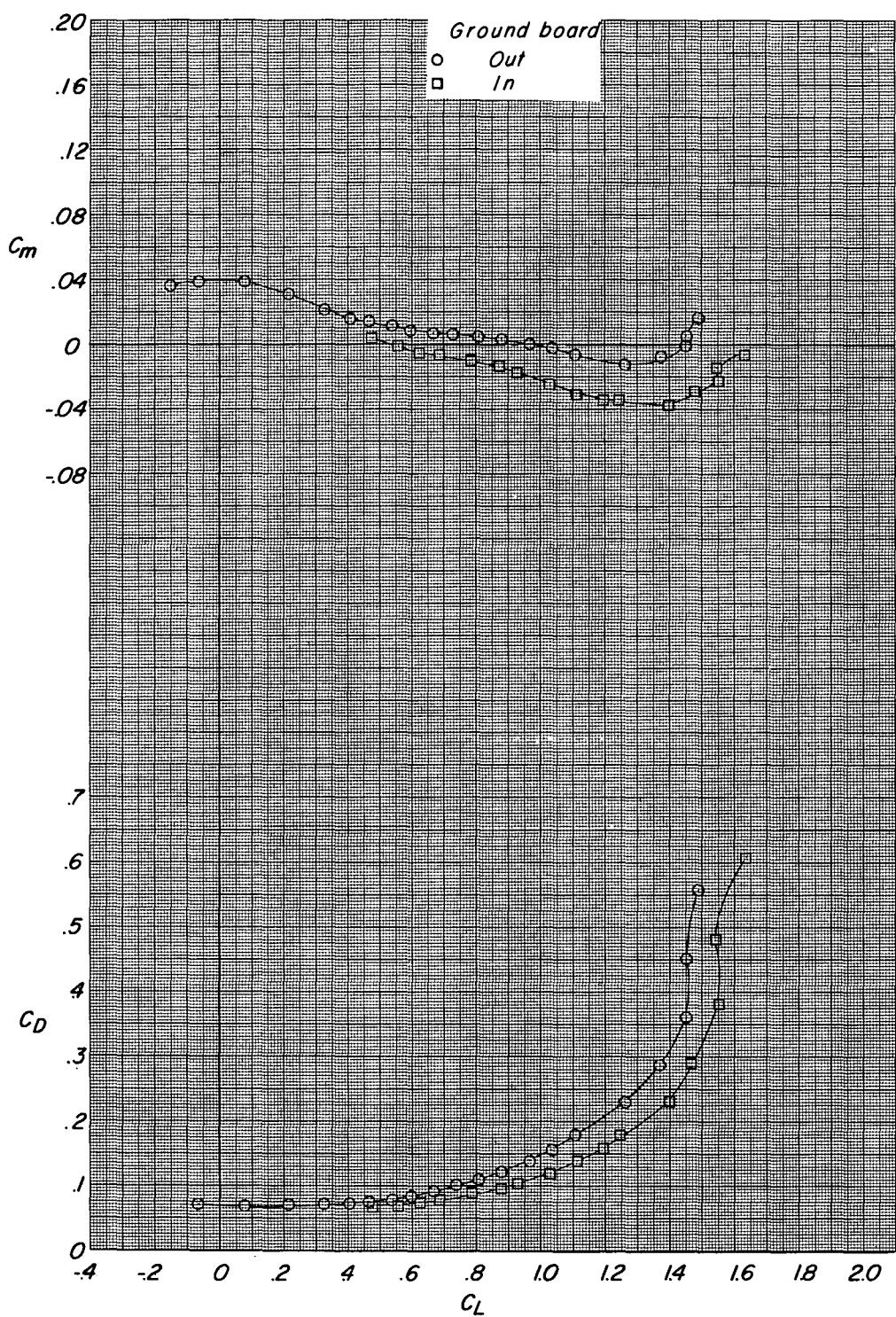


Figure 56..- Concluded.

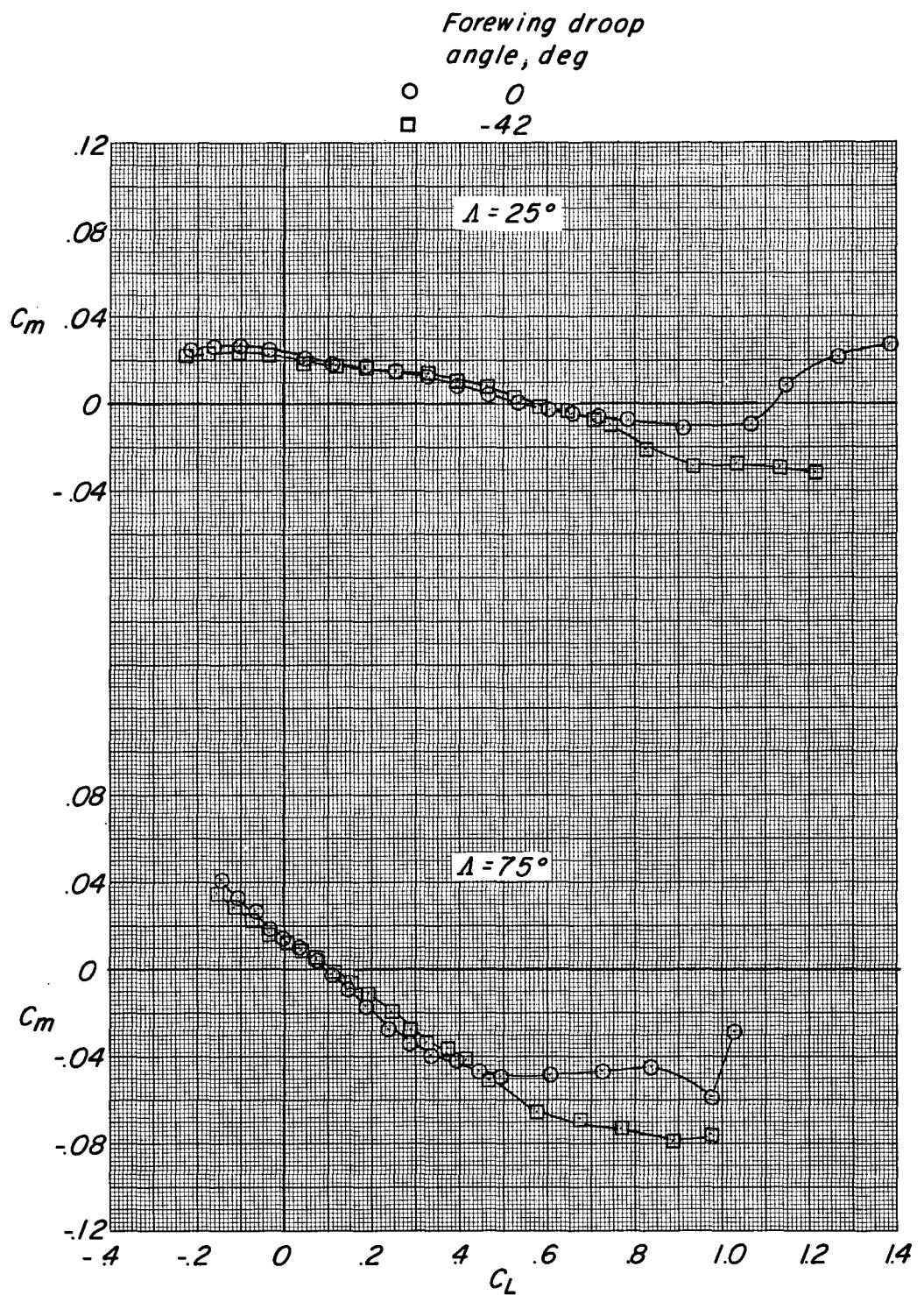


Figure 58.- Effect of forewing droop on the pitching-moment variation with lift coefficient.
WBNH₁V1.

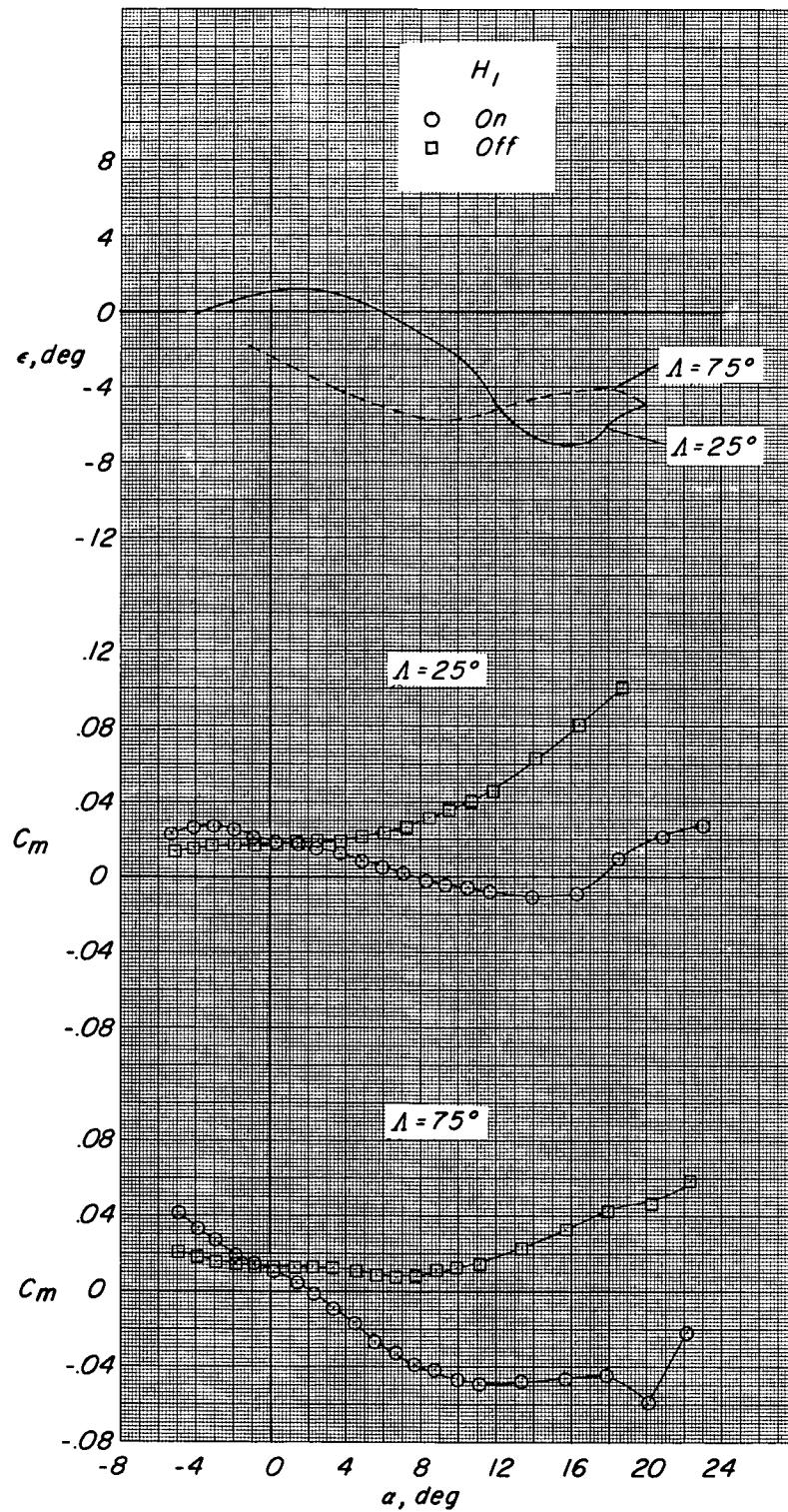


Figure 57.- Variations of downwash angle and pitching-moment coefficient with angle of attack for the configuration with and without the horizontal tails. WBNH₁V₁; it = 0°.

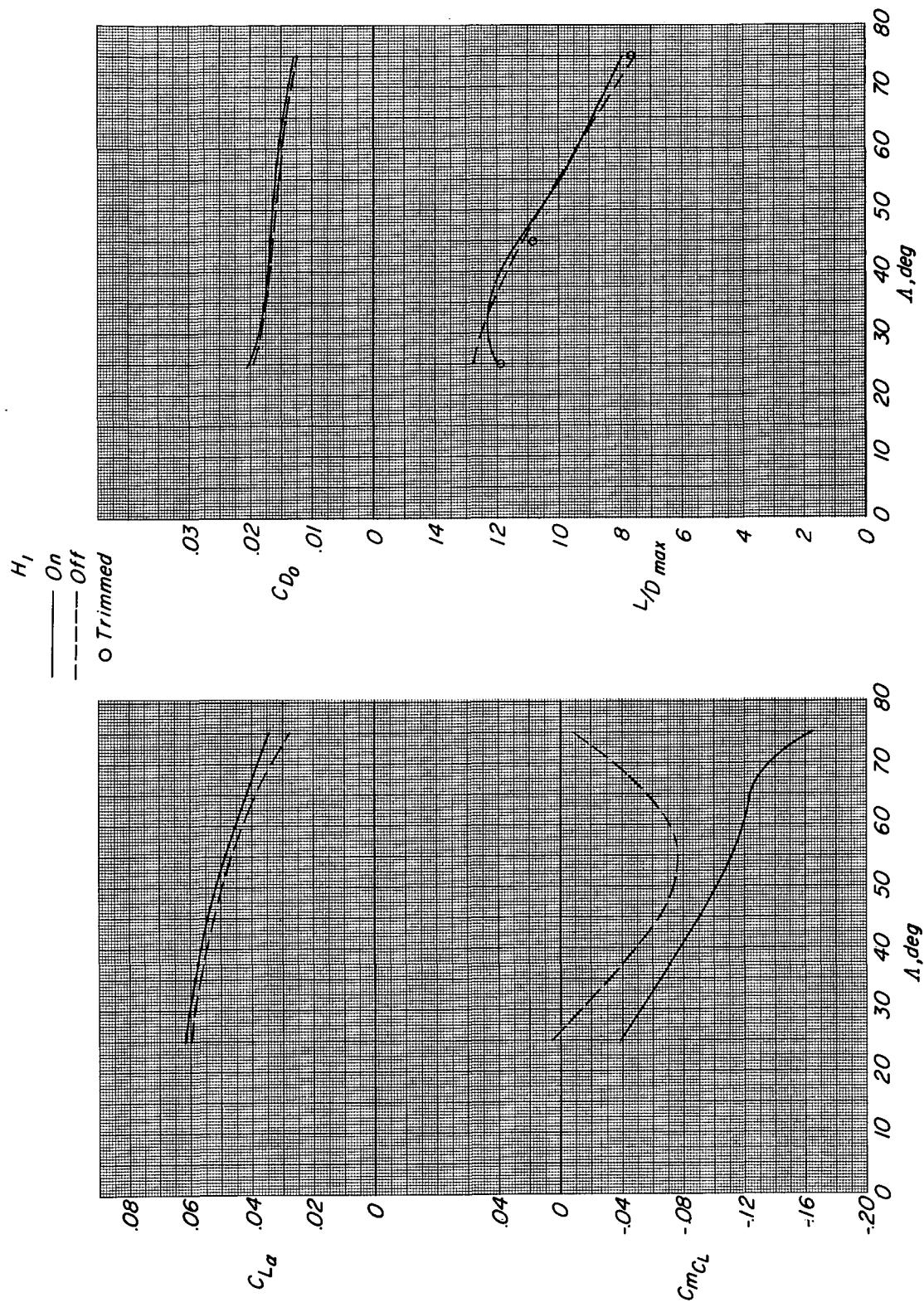


Figure 59.- Effect of horizontal tails on the longitudinal aerodynamic characteristics. WENV₁.

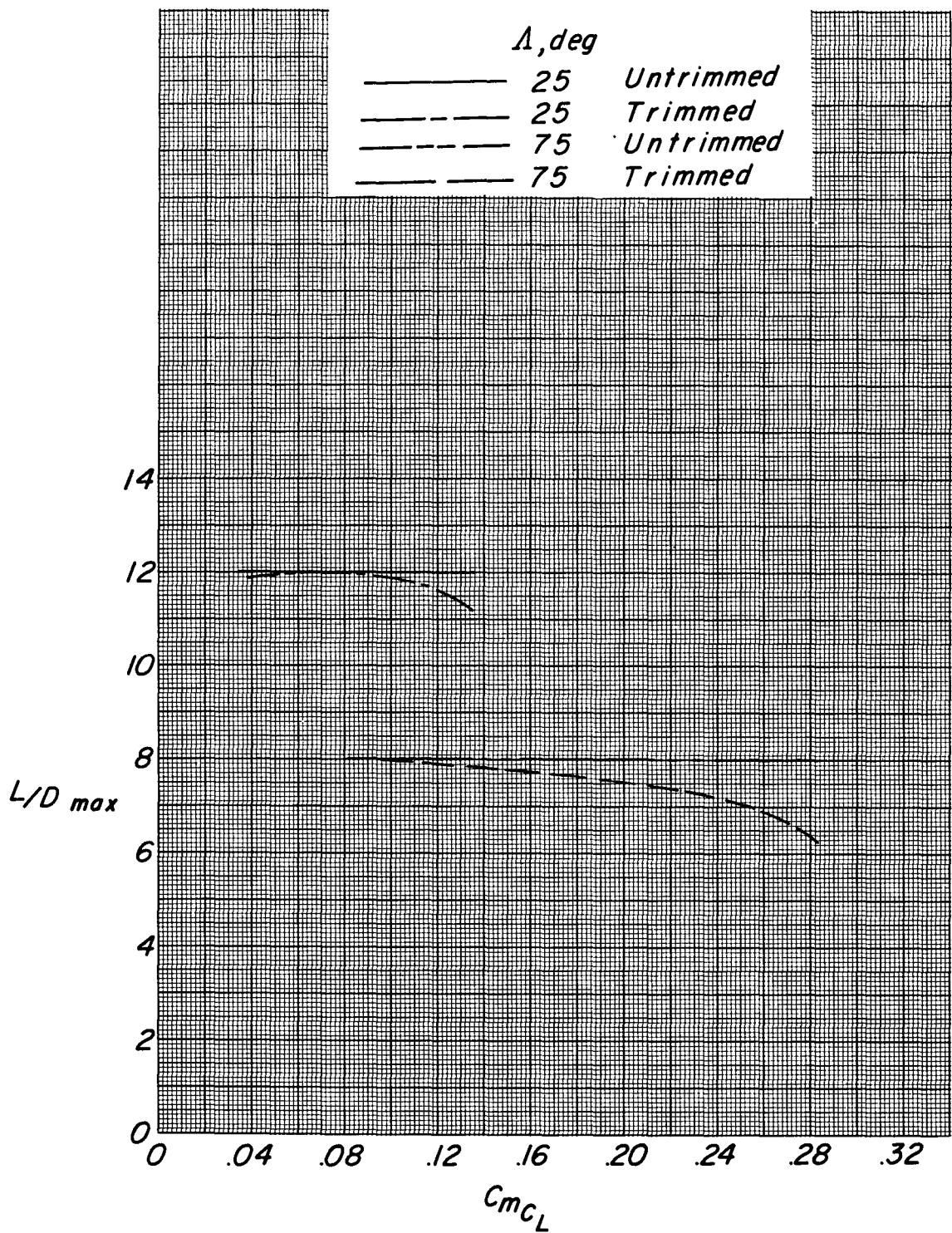


Figure 60.- Variation of trimmed and untrimmed maximum lift-drag ratio with longitudinal stability parameter. WBNH₁V₁.

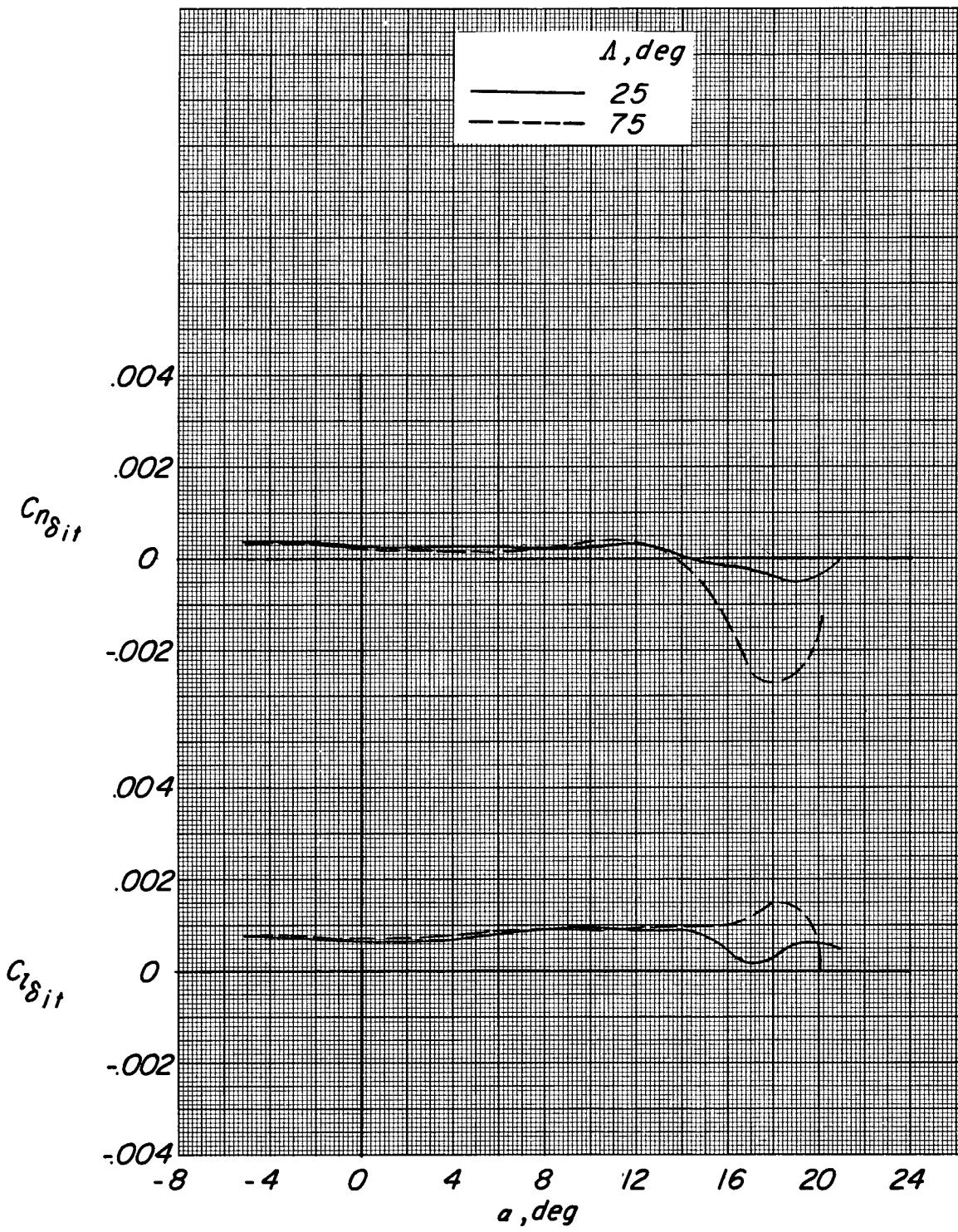


Figure 61.- Effect of differential deflection of the horizontal tail on the lateral aerodynamic characteristics. WBNH₁V₁.

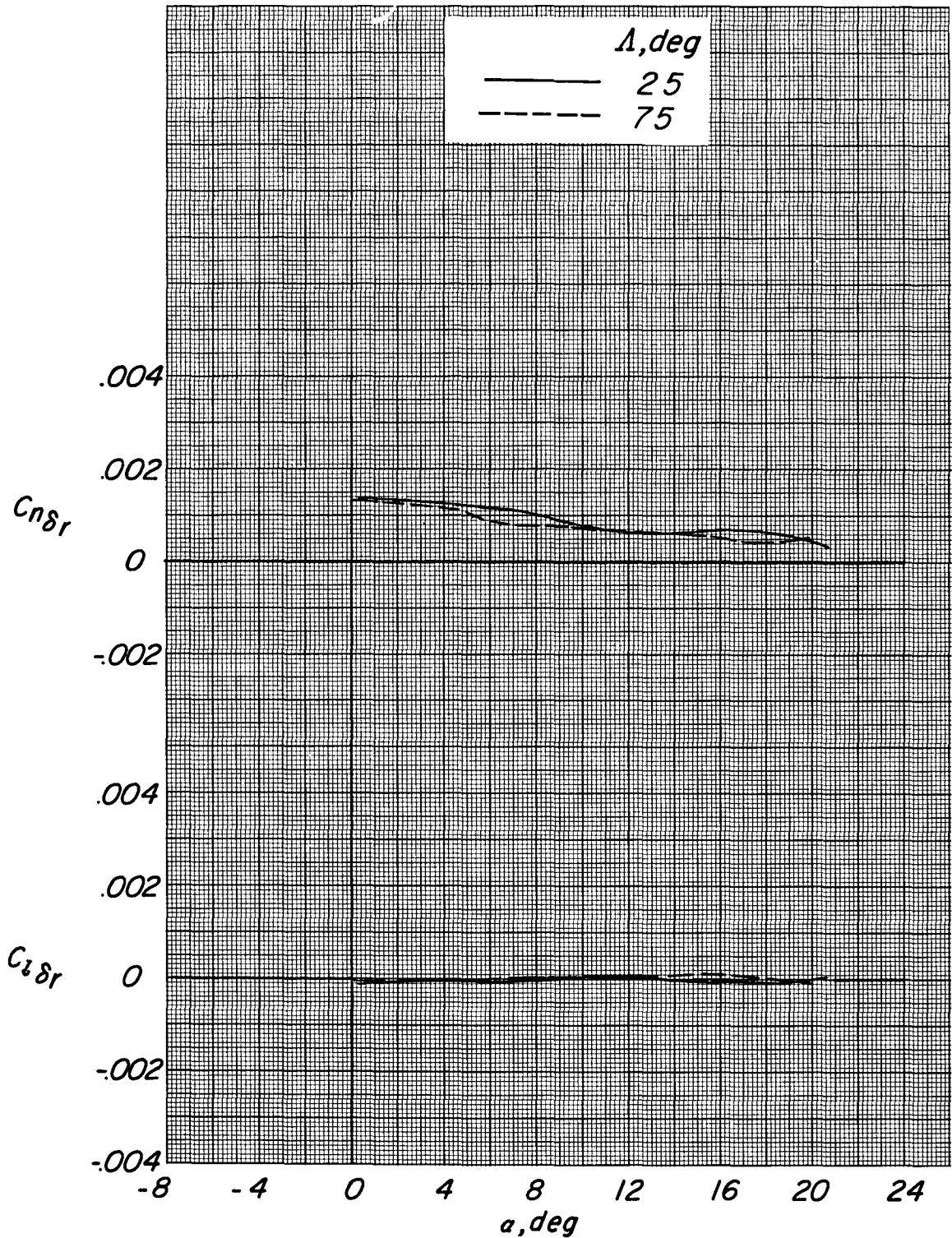


Figure 62.- Effect of deflection of the rudder on the lateral aerodynamic characteristics. WBH₁V₂.

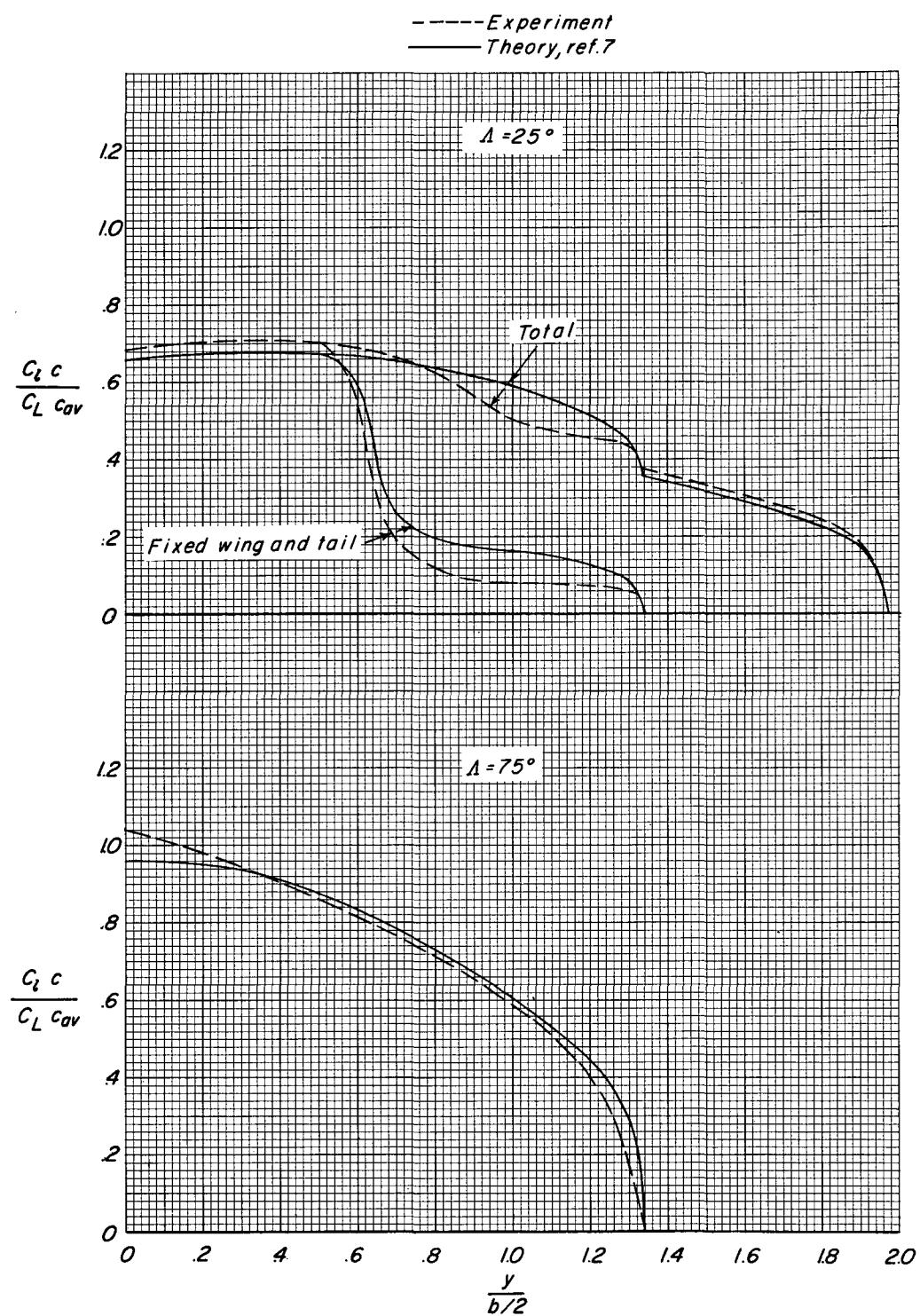


Figure 63.- Comparison of the experimental and theoretical span load distributions on the wing in the extreme sweep positions. WBNH₁V1.

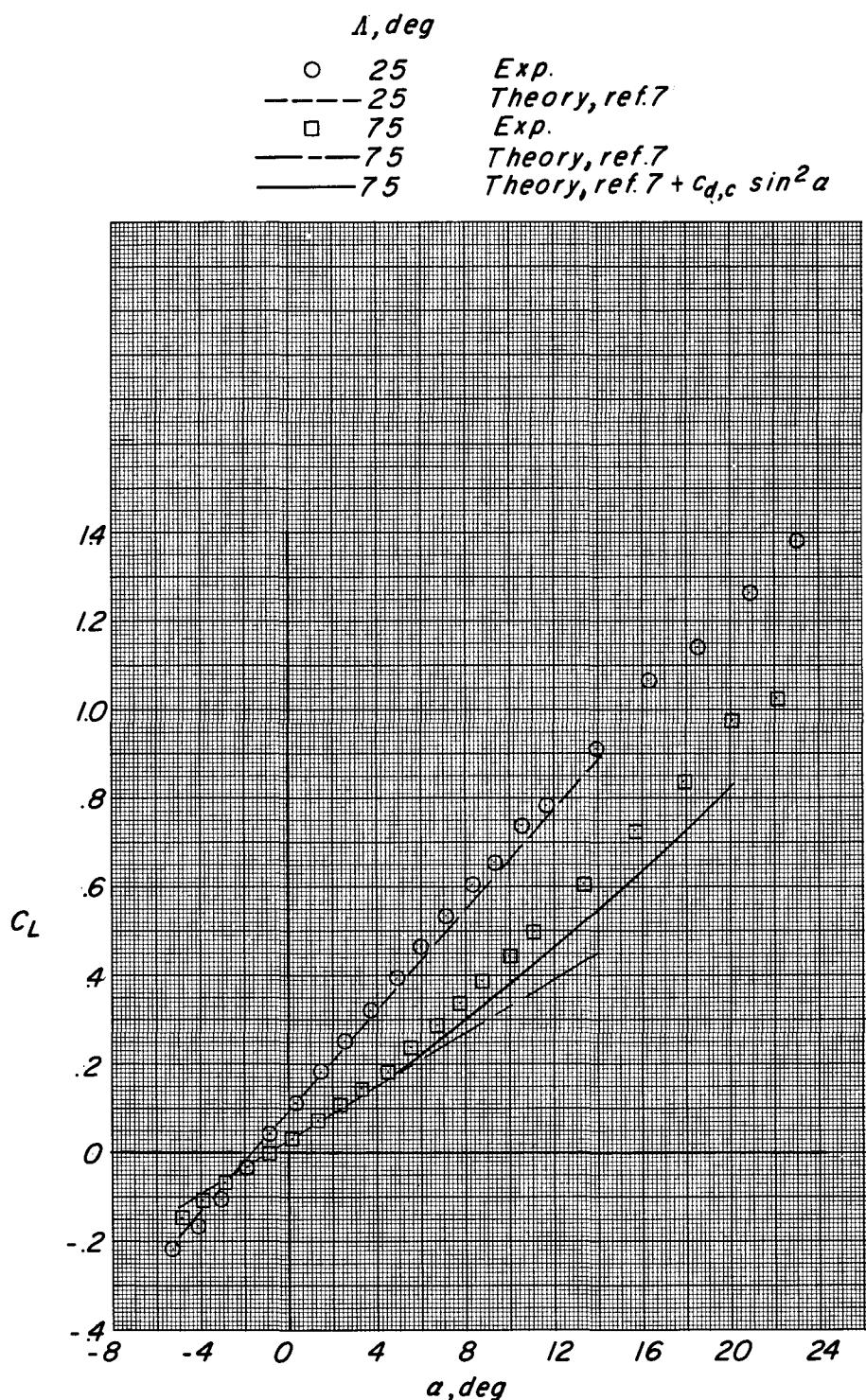


Figure 64.- Comparison of the experimental and theoretical lift coefficient variation with angle of attack. WBNH₁V₁.

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—NATIONAL AERONAUTICS AND SPACE ACT OF 1958

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